10 March 1976

DAIG IN 21-75

# report on

## Use of Volunteers in Chemical Agent Research

by

# the inspector general

# department of the army

DEPARTMENT OF THE ARMY
OFFICE OF THE INSPECTOR GENERAL AND AUDITOR GENERAL
WASHINGTON, D.C. 20310

DAIG-IN 21-75

# Use of Volunteers in Chemical Agent Research

10 MAR 1976

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DEPARTMENT OF THE ARM
OFF OF THE INSPECTOR GENERAL AND AUD R GENE
WASHINGTON, D.C. 20310

REPLY TO ATTENTION OF: DAIG-IN

SUBJECT: Research Report Concerning the Use of Volunteers in Chemical Agent Research

This research report was prepared by Colonel James R. Taylor and Major William N. Johnson, Inspectors General, Office of The Inspector General, Headquarters, Department of the Army, pursuant to the Vice Chief of Staff Letter of Instruction, dated 21 July 1975.

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AMERICAN REVOLUTION BICENTENNIAL 1776-1976

# USE OF VOLUNTEERS
# IN
# CHEMICAL AGENT RESEARCH

## TABLE OF CONTENTS

PAGE

I FOREWORD . . . . . . . . . . . . . . . . . . . . . . . . . 1

II HISTORY OF CHEMICAL WARFARE . . . . . . . . . . . . . . . . 6

III PSYCHOCHEMICALS, LSD - ITS DISCOVERY, DEVELOPMENT AND USE . . . . . . . . . . . . . . . . . . . 11

IV PERCEPTION OF THE THREAT . . . . . . . . . . . . . . . . . 18

V DERIVATION AND INTERPRETATION OF AUTHORITY . . . . . . . . . . 29

VI HUMAN VOLUNTEER SELECTION AND SCREENING PROCESS . . . . . . . . 61

VII INFORMED CONSENT . . . . . . . . . . . . . . . . . . . . . 77

VIII CHEMICAL WARFARE EXPERIMENTATION WITH HUMANS AT EDGEWOOD ARSENAL . . . . . . . . . . . . . . . . . . . . . 91

IX FIELD TESTING . . . . . . . . . . . . . . . . . . . . . . . 107

- A. Fort Bragg . . . . . . . . . . . . . . . . . . . . . 110
- B. Fort McClellan . . . . . . . . . . . . . . . . . . . 118
- C. Fort Benning . . . . . . . . . . . . . . . . . . . . 125
- D. Dugway Proving Ground . . . . . . . . . . . . . . . . 128

X INTELLIGENCE CORPS LSD TESTING . . . . . . . . . . . . . . . 135

- A. Edgewood Phase . . . . . . . . . . . . . . . . . . . 137
- B. Third Chance . . . . . . . . . . . . . . . . . . . . 142
- C. Derby Hat . . . . . . . . . . . . . . . . . . . . . . 144

XI CONTRACTS WITH CIVILIAN INSTITUTIONS . . . . . . . . . . . . 152

XII INCAPACITATING RESEARCH COSTS . . . . . . . . . . . . . . . 169

XIII BIBLIOGRAPHY . . . . . . . . . . . . . . . . . . . . . . . 1

# FOREWORD

During the 1975 hearings conducted by the Senate Select Committee to study Governmental Operations with Respect to Intelligence Activities, the U.S. Army's role in research and experimentation with hallucinogenic drugs became a matter of interest and concern to the Committee and the public. The coupling of Army efforts in chemical agent research and actions involving the Intelligence community resulted in a spate of publicity both factual and speculative.

During the same general timeframe, the ongoing joint hearings of the Senate Labor and Public Welfare Committee, Subcommittee on Health, and the Senate Judiciary, Subcommittee on Administrative Practice and Procedure, asked questions of the Army about the Human Volunteer Program, the quality of "informed consent" as related to research volunteers, and the adequacy of medical follow-up on those who had volunteered to take part in research projects over the years.

As a result of the several congressional hearings and subsequent publicity, numerous requests for information were received by the Department of Defense from congressional committees, individual members of Congress, private citizens and the media. The nature of the inquiries reflected the different interests involved and resulted in several different staff agencies within Department of the Army being tasked to provide the requested information.

The lack of factual information available to quickly respond to the inquiries illustrated an inadequacy of the Army's institutional memory on this subject area. This inadequacy was aggravated by inconsistencies in the limited data which was available.

These shortcomings in responding fully, accurately, and rapidly, particularly at a time when Governmental agency actions and programs were already suspect, placed an additional strain on the public's faith in the credibility of the U.S. Army.

To assure that requests for information concerning the Army's role in hallucinogenic drug research were answered factually, the Secretary of the Army directed that a research effort be made to determine what had been done in chemical agent research. Accordingly, The Inspector General and Auditor General, Headquarters, Department of the Army, was directed to conduct the necessary research to determine the Army's role in drug testing. A verbatim text of the Letter of Instruction which directed the research effort is reprinted below:

21 Jul 1975

SUBJECT: Letter of Instruction

The Inspector General and
  Auditor General
Department of the Army
Washington, D.C. 20310

1. Recent public and Congressional interest in the Army's use and testing of hallucinogenic drugs has generated numerous requests from the news media for information concerning these activities. Records currently available to the Army Staff indicate that these tests were conducted during the period from the early 1950's through the late 1960's at various locations in the United States and overseas. However, due to the lengthy time span involved in the testing program, many of the supervisory personnel involved in the program and the records and reports pertaining to the planning, conduct, and results of the tests have been retired. This situation places the Army in a position of not being able to reply quickly and factually to requests for information from various news and Congressional agencies.

2. You are directed to conduct the necessary research to establish the historical facts and circumstances surrounding the U.S. Army's participation in the testing of hallucinogenic drugs. Specifically, your research will be in sufficient detail to provide, at a minimum, the following information: a clear reconstruction of the programs and projects involved with particular emphasis on the rationale used as a basis for their initiation; appropriate mandates and authorizations upon which the testing programs and projects were initiated, examination of extent of volunteers, the use of subjects without subjects' knowledge; and the costs of such projects and programs funded by the Department of the Army to include the total cost of operation of the Special Operations Division, Fort Detrick, MD.

3. The Surgeon General and the Assistant Chief of Staff for Intelligence will provide technical assistance as required and will provide access to and copies of any reports pertaining to the testing of hallucinogenic drugs by the Army which are required to complete your research. The Commander, U.S. Army

Materiel Command, will provide assistance required by your research teams in gaining access to installations, testing facilities, and records storage facilities. The research teams are authorized access to all records, files, facilities, and information which they consider necessary to accomplish this tasking.

4. Your report will be submitted to the Chief of Staff as expeditiously as possible consistent with the requirement to insure that the information provided is complete, factual, and accurate.

S/
WALTER T. KERWIN, JR.
General, United States Army
Vice Chief of Staff

This mission was unlike the usual directive for inquiry or investigation normally assigned to The Inspector General for action. Instead of determining the facts and circumstances of a specific wrong(s) or allegation(s), the mission was to conduct a form of historical research; research which would determine exactly what the Army had done in chemical agent testing during the period 1950–1975. A period which probably had as many changes, programs, and problems as any comparable period in history: post-World War II; the Korean War; the Cold War; reorganization of Department of Defense; reorganizations of Department of the Army; the war in Vietnam; and major advances in medicine, the sciences, nuclear weapons, missiles, and aircraft. The sheer volume and frequency of change alone provided some indication of the magnitude of the task to be performed. From the outset, the research effort proved to be difficult and cumbersome.

The research was not to include any activities or arrangements between Department of Defense and the Central Intelligence Agency concerning biological/chemical agents and weapons systems for delivery, but was to be limited to the Army's participation in the testing of d-lysergic acid diethylamide (LSD) with emphasis on the rationale used as a basis for test initiation; authorizations upon which the testing programs and projects were initiated; and the costs of such projects funded by Department of the Army. An exception was made to the limitation on the research as it concerned DOD/CIA and biological agents, in that the total cost of operating the Special Operations Division (SOD), Fort Detrick, MD, from 1953 to 1971 was to be determined.

The research scope eventually was enlarged to include drugs other than LSD. Initially, the term hallucinogenic was used as a means of describing the extent of the research, however, as more accurate information was received, the inaccuracy and inadequacy of the term became apparent. Ultimately, the study was to include LSD and also other drugs generally classified as chemical incapacitating agents, to include benzilates and glycolates. All drugs investigated or tested during the period were not included in the research, however, those which figured prominently in the Human Volunteer Program were reviewed.

The search for records was to prove particularly difficult. Current records posed no particular problem, since records handling policies made them reasonably available; however, the majority of the records involved were not current. Most of the research effort, particularly on LSD, occurred during the 1950s and early 1960s; these records had long since been retired and in some cases destroyed in accord with normal destruction schedules. The frequent changes in the U.S. Army organizational structure resulted in many changes in unit designations and locations, resulting in records being retired, destroyed, or relocated without adequate concern for proper disposition of records with historical significance.

Where records were not available or where information gaps existed, plans were developed to interview the personnel involved, both the scientist and the subject volunteer. Since the research spanned a 25-year period, many of the personnel actively involved in the research programs were retired, quite elderly, moved to new locations, or deceased.

The history of the Human Volunteer Program was examined in considerable detail. The use of humans in chemical agent research was examined from the earliest days of the Chemical Warfare Service during World War I through the publication of the Secretary of Defense (Wilson) memorandum in 1953, and then tracing the development of the formal volunteer program in use today. The selection of volunteers, to include the pre- and post test medical examinations, care during the experiments, and most important, the quality of informed consent was examined critically by reviewing medical records maintained on volunteers and in limited cases interviewing the volunteers.

The thoroughness of the research effort is indicated by the following statistical data:

a. Interviews of 65 witnesses were conducted in 32 cities, in 17 states, and the District of Columbia and involved traveling in excess of 160,000 passenger miles.

b. Tens of thousands of pages of documents were reviewed at various locations to include the National Archives; the National Records Center, Suitland, MD; the Army Records Center, St. Louis, MO; the Army War College Library, Carlisle Barracks, PA; Edgewood Arsenal, Edgewood MD; Aberdeen Proving Grounds, Aberdeen, MD; Fort Detrick, MD; Fort McClellan, AL; and the files of the various staff agencies, commands, or units which might have been involved, no matter how peripherally, with the chemical research program. Additionally, witnesses were requested to provide any documents or evidence which might have come into their possession.

Certain events which occurred during the course of the research effort added to the complexity of the effort and served to stretch out the time required to complete the project. First, there were the allegations aired publicly on TV and other media reflecting on the fitness of the Chief of the Medical Research Division, Biomedical Laboratory, Edgewood Arsenal. The person involved was in charge of the drug testing program. An investigation concerning this matter was conducted and reported separately. Then, during the course of records and file searches it was learned that a civilian patient in a New York psychiatric hospital had died in 1953 after receiving an experimental drug which had been provided the hospital by the U.S. Army (Chemical Corps) as part of a research project conducted by the hospital under an Army contract. An investigation of this incident was also conducted and reported separately. Finally, during the course of the research information was received indicating that the U.S. Army Intelligence Center/School had conducted jointly, with the Chemical Corps, a series of research projects involving LSD at Edgewood Arsenal, U.S. Army, Europe, and the U.S. Army, Pacific. A report of those tests is included herein.

It is in this vein that the research was conducted. Every effort was made to obtain and review pertinent data. Where records did not exist, the testimony of witnesses was solicited to fill in the gaps. Where neither documentary or testimonial evidence was available, then license was taken by drawing logical conclusions or assumptions based on evidence available, past performance, or other indicators. Where this occurred, efforts to clearly identify such license is made.

# CHAPTER I

# HISTORY OF CHEMICAL WARFARE

## General

The purpose of this chapter is to provide a brief description of the evolution of chemical warfare development and its employment by various combatants throughout military history.

Chemical warfare is generally thought of as the intentional employment of toxic liquids or solids to produce casualties, plus the use of screening smoke or incendiaries.[1]

History reveals numerous occasions where combatants employed chemical warfare to serve their tactical advantage. Some of these events are worthy of mention in this report in order to establish the roots from which the modern concepts have evolved.

## Pre-World War I

Incendiary chemicals were recorded in warfare as early as 1200 B.C. in a form called "Greek Fire." This secret chemical formula caused a substance to spontaneously burst into flame on contact with water. Other combatants such as the armies of India and the Roman Empire later refined the process to make it employable on land as well as water.[1] This novel weapon is credited with saving the Byzantine Empire from enemy domination for nearly a thousand years. So effective was "Greek Fire" that it was still very much in use some two thousand years later. It was reported to have been successfully employed by King Constantine against the Saracens in 673 A.D.; and later by the Saracens against the Christians in the Crusades. A form of "Greek Fire" was used by Union General Gilmore in the American Civil War and caused Confederate General Beauregard to write that Gilmore was firing "the most destructive missiles ever used in war."[2]

Other forms of chemical warfare were reported in ancient times as early as 431 B.C., in battles between the Athenians and Spartans. In this instance the Spartans burned wood pitch and sulphur under the walls of the cities of Placea and Belium to choke the defenders. The Spartans also melted pitch, charcoal, and sulphur in huge kettles and blew the fumes over the defenders' lines by means of bellows. Still other recordings reflect that in 360 B.C. the Trojan King Aneas used a composition of pitch, sulphur, tow, resinous wood, and other inflamable substances which were hurled in pots from the walls of besieged cities. The Chinese developed stink pots, thousands of years ago, for both offensive and defensive employment. The ancient Japanese warriors used finely ground pepper to produce lachrymatory (tear) effects. In the Russo-Japanese War, crude grenades of rags soaked with arsenic compounds were burned by the Japanese on the ends of bamboo poles to generate choking fumes to waft on enemy trenches. In 1855, during the Crimean War, the British planned to use burning sulphur in the siege of Sebastapal. However, the plan was reportedly discarded as inhumane. Still later in the American Civil War, during the siege of Charleston, SC, the Union Army used burning wood that had been saturated with sulphur in an effort to force the defenders to evacuate the city.[2]

Although there is very little evidence to indicate that chemical warfare was of major significance in most early military confrontations, the potential of its future role was of sufficient concern to make it an issue at The Hague Conference of 1899. In fact, a prohibition of gas warfare was agreed to by a number of countries at The Hague, including ratification by Germany, however, neither the United States nor Great Britain signed this treaty, which banned use of gas filled projectiles.[3]

## World War I

In August 1914 the French used rifle-fired tear gas grenades to harass the German attackers. Germany claimed this violated The Hague accord. The French countered that since tear gas was designed to control civil commotions, its use could not be considered an act of chemical warfare. Shortly thereafter, the British and Germans also employed tear gas. The Germans' use of chlorine gas on 22 April 1915, against the French and British at Ypres, was perhaps the first recorded significant gas attack. The gas had a definite demoralizing effect on the attacked forces.[1,2,3] Three months later the British hurriedly formed "The Special Brigade, R.E." On 25 September 1915 the British showed the Allies the folly of being unprepared to enter chemical warfare when the kilted members of the Special Brigade attempted to carry their chlorine filled cylinders into the German trenches at Loos, France. None of the chemical carrying attackers reached the German emplacements and very few of them returned. Loos became a tragic defeat for both the British 15th Division and their initial chemical warfare effort. Fortunately, the Germans' failure to exploit their success provided the remnants of the Special Brigade another chance.[5] Their second effort came on 13 October 1915 with the attack on Hulloch Redoubt. Having learned valuable lessons in defeat, the British use of gas met with marked success on this occasion.[5] The lid was off and chemical warfare was quickly integrated into battle plans on both sides.

Later still in World War I the Germans introduced phosgene, a choking gas, and by the end of 1915 they had added a vomiting gas to force their foes to unmask so the phosgene could reach the lungs. By mid-1916 the French and Austrians had introduced another family of toxic gases called "Blood Gases." In July 1917 the Germans introduced mustard gas--a blistering agent that could produce casualties among masked troops. In February 1918 the American troops were attacked by Germans using phosgene and chlorophicrin gas. The American forces retaliated for the first time in June of 1918 with phosgene. World War I saw both sides employ approximately 17,000 chemical troops to cause more than one million casualties, 90,000 of whom died.[1]

Chemical warfare was horrifying to the civilized world, but it also offered the possibility of the discovery of more humane weapons. This possibility was recognized, to a degree, through a comparison study of American casualties. One third of ou casualties were caused by gas, of whom approximately two percent died. In contrast, 25 percent of the non-gas casualties died.[6] In all, over 3,000 substances were investigated for toxic use in World War I, 32 were tested in combat, and 12 attained noteworthy results.[1]

## Post-World War I

Following World War I, a new attempt was made in 1921, at Washington, DC, to prohibit the use of war gases and similar materials. This subsequent proposal was not ratified by France and, as a result, the proposal was voided. In 1925, at the Geneva Conference, a treaty resolution called for prohibition of war gases and bacteriological warfare. Great Britain, the USSR, and other nations, in ratifying the treaty, made it clear that they were bound only in relation to other countries complying with the treaty terms. The United States, Japan, Czechoslovakia, Argentina, and Brazil did not sign the treaty.[1,3]

Eleven years later the world would learn that the treaty was not an effective deterrent. In 1936 the Italians used mustard gas against the bare-footed local forces of Abyssinia; both countries were signatories of the 1925 Geneva Protocol against the use of gas. Between 1937 and 1943 the Japanese repeatedly used gas attacks against the Chinese forces to overcome their superiority in numbers.[1,4]

## World War II

In general, toxic gas employment did not play an important tactical role in World War II. Incendiaries represented the principal chemical munition used in that war. Although the major parties to the War carried toxic gases in their inventory, threats of retaliation were credited as the deterrent force.[7] At the close of the war, the Allies were shocked to discover that the Germans possessed large stocks of new gases of the nerve poison category. These were far more deadly than the standard gases available to the Allies.[2] The Russians had captured a German Tabun plant and moved it to Russia; subsequently, tabun (GA) became their standard nerve gas. The United States adopted sarin (GB), which also was discovered by Germany, as its standard nerve agent.[1] Thereafter, stockpiles of nerve gases multiplied on both sides of the iron curtain. Both sides continued research to find new toxic chemical agents of greater lethality and employability.[11]

## Korean War

The Korean conflict was conducted without use of toxic chemical agents by either side.[1,4] The Russians accused the UN forces of employing deadly chemical and biological agents. However, no evi.ence was ever produced to support this claim. Conversely, the United States strongly suspected the Chinese and North Koreans of using psychochemical drugs as part of their "brainwashing techniques" on prisoners of war. This opinion was shared by many knowledgeable officials in the Defense Department, several congressmen, and some members of the scientific community.[1,8] Great concern was voiced throughout the military and the general public; could we train, equip, or otherwise prepare our troops to detect and resist the use of chemical agents designed to break their will and cause irrational behavior?

## Current

Since the Korean War a great many armed confrontations have been recorded, and although research, development, and stockpiling of chemical weaponry made major strides throughout the world, riot control agents, herbicides, and incendiaries were the extent of chemical munitions known to have been employed. An exception was recorded in the conflict between Egyptian and Yemen forces in 1966-1967 when both sides reportedly used Russian and Bulgarian supplied phosgene gas and perhaps a nerve agent.[8]

Meanwhile, in the United States the national strategy that followed the Korean War moved steadily toward massive nuclear retaliation. Although the policy did not eliminate chemical warfare's importance, it did place primary focus on nuclear weaponry for both offensive and defensive purposes. Research and development in chemical warfare continued, but was marked by a disinterest in its value for future employment. As the impact of the policy of massive retaliation became better understood by researchers and planners alike, concern for an alternative to this policy became apparent. Among the alternatives considered was a greater role for chemical warfare.[1,6] By the late 1950s the Chemical Corps was experimenting with a wide range of chemical agents, which included the World War II agents of chlorine, phosgene, chlorophicrin, and nitrogen mustards. Also included were the German developed nerve or anticholinesterase agents of GB and GA (sarin and tabun), as well as new, more toxic anticholinesterases. Another category under study was the incapacitating or non-lethal agents.[8] Within this class there was emphasis on both psychochemicals and physical incapacitants. It is this environment and period in our history on which this report will focus.

## FOOTNOTES

## CHAPTER I

1. House Report No. 815, by The Committee on Science and Astronautics, House of Representatives, 86th Congress, 1959.

2. Report entitled, "Warfare Gases, History, Description, Medical Aspects," by H. L. Gilchrist, undated.

3. Intelligence Staff Study, "Soviet Research and Development Capabilities for New Toxic Agents," dated 1958.

4. Report by Chemical Warfare and the Chemical Warfare Service published in October 1942.

5. Committee (American Chemical Society) Advisory to the U.S. Army Chemical Corps, 19-20 May 1958.

6. The Weekly Publication of the Society of Chemical Industry, Report No. 46, London, dated 12 November 1960.

7. Research paper by Dr. L. Wilson Greene, Army Chemical Center, Maryland, title, "Psychochemical Warfare, A New Concept of War," prepared in August 1949.

8. Minutes of Senate, Foreign Relations Committee hearing of April 1969, 1st Session of the 91st Congress.

9. Chemical Warfare Laboratory Special Publication, "Current Status of Incapacitating Agents Program," by Dr. Witten, dated September 1962.

10. Booklet entitled, "Weapons of Counterinsurgency Chemical/Biological, Anti-Personnel, Incendiary," published by NARMIC on 15 January 1970.

11. History of U.S. Army Chemical Corps, Volumes I and II.

# CHAPTER II

# PSYCHOCHEMICALS

## General

The purpose of this chapter is twofold: the first is to provide a set of common definitions which will be acceptable for use throughout this report; and the second is to trace the discovery and use of LSD and other psychotropic drugs in both ancient and modern times.

The review of the literature and interviews with personnel involved with the drug research program disclosed a degree of confusion resulting from a lack of consensus as to the meaning of specific words and terms associated with chemical agent research efforts. To preclude misinterpretation or ambiguity in subsequent discussions about psychochemicals, terms frequently used in conjunction with the research effort are defined below.

Incapacitating - Non-Lethal Agents are defined as those compounds which when delivered or employed in an effective dose can interfere with an individual's performance of duty for a militarily significant period of time, but which will allow him to recover completely without medical aid.[1]

Physical Incapacitants are those compounds which are active in small doses and which produce a significant or profound disturbance, anesthesia, paralysis, or immobilization for a significant, but temporary, period. Included among the effects are: impairment of vision (physiological); impairment of hearing; postural lowering of blood pressure of such a degree that standing is impossible; rigidity; tremors; convulsions; induction of severe symptomatic nausea and vomiting; and interference with ability to regulate body temperature.[1,2]

Psychological Incapacitants or Psychochemicals are those compounds which produce a mental incapacitation, in effect diminishing a person's will to resist. They effect the central nervous system and may cause one or more of the following: impairment of the thinking process; memory lapse; blackout (mental); or loss of touch with reality.[1]

Psychotropic is a term used almost interchangeably with psychochemical, but without a good semantic justification. Psychotropic drugs are defined formally as those having a tropism or affinity for the psyche or, presumably, the central nervous system. For purposes of this research effort, the following definition will be used: A psychotropic drug is one which produces any degree of mental incapacitation or disassociation, and which could alter the state of mind or mood. Its main effect is on the central nervous system and includes compounds classified as follows:

a. sedatives (hypnotics) which slow mental activity, such as alcohol and barbiturates;

b. stimulants which speed up activity, such as amphetamines and caffeine;

c. tranquilizers (major) which calm psychotic behavior, such as chlorpromazine;

d. tranquiliziers (minor) which calm anxiety, such as meprobamate;

e. anti-depressants which stimulate activity, such as phenolzine; and

f. psychotomimetics (hallucinogenics) which cause deep changes in mood and perceptions, such as LSD and mescaline.

Psychotropic drugs can also be described as either deliriants or hallucinogenics:

a. Deliriant drugs are those which produce or tend to produce delirium as a primary effect. Included within the category are anticholinergics such as scopolamine, benzilates, and glycolates.[2] These drugs may produce vivid visual hallucinations but the memory of them is depressed and the overwhelming drug effect is to slow mental and physical activity.

b. Hallucinogenic or psychotomimetic drugs are those whose effects mimic insanity or psychosis, but which usually are easily differentiated from a true psychosis. These drugs are also called psychedelics (mind manifesting) and include such drugs as LSD and mescaline. These drugs tend to activate rather than depress mental activity. The visual hallucinations they produce sometimes involve bizarre distortions of physical objects and are often vividly remembered.

Chemical agents were not of interest to the military on the basis of their ability to cause hallucinations or delirium as such, but rather for their ability to cause an enemy to be militarily incapacitated, either by sedation, psychosis, or physical means, so that he would not be able to make a normal or routine response to a specific military situation or demand.[1]

## Psychochemical Compounds

Several of these compounds have been the subject of extensive medical research and have lengthy and detailed histories. Mescaline, which is obtained from the peyote cactus, can be traced to the ancient Aztec professional diviners, who achieved inspiration by eating either the mescal buttons or the psilocybin producing mushroom. As a matter of interest, the name mescaline was adopted because of its use by the Mescalero Apaches in the 19th century. Indian natives of the Great Plains, where the peyote cactus was readily available, developed the peyoto rite called peyotism, which spread to the Comanches and Kiowas, who transformed the rite into a religion. Eventually, the plains tribes fused their peyotism religion with Christianity and greatly subordinated the ritual use of this hallucinogenic compound.[3] The "Psilocybe Mexicano" mushroom also was used by medicine men of Indian tribes in Mexico during the 19th century.[4]

Hallucinogenic type drug use began with primitive societies as a means of divination, curing sickness, communion with supernatural powers, medication, and such mundane purposes as allaying hunger, discomfort, and boredom. Although there are many historical examples, a few are worthy of mention to further establish that hallucinogenic drugs and their use are not new.

Siberian tribes, such as the Koryak, Chuckihee, and Kamchadal, have for centuries made use of the hallucinogenic properties of "Fly Agaric," which is derived from a rare mushroom found in the barren and formidable areas of the northeastern regions of Asia. Their use was motivated by a desire to escape from the harsh environment, as well as to facilitate contact with the spirit world.[3]

In Australia, certain Aborigines extracted "pituri" from the leaves of a potato-like shrub. The extraction contained scopolamine, which they used to suppress thirst and hunger.[3]

In Venezuela, Brazil, and Columbia, primitive tribes have for ages escaped the realities of their plight by utilizing the hallucinogenic properties of the "yakee," "epena," "yopo," and "niopo" plants.[4]

## Lysergic Acid Diethylamide (LSD)

LSD is one of a group of drugs know as ergot alkaloids. Ergot is formed by the growth of the "ascomycetous fungus" on various grasses and sedges, such as rye, wheat, oats, barley, rice, and algerian diss (a reedy grass of the Mediterranean region used in basket and cord making). The chief botanical source of commercial ergot in the United States and in European countries is the rye plant. Ergot has long been used in medicine because of its specific action in contracting uterine musculature, and was used in midwifery in the 18th and 19th centuries, where it was employed as an abortifacient.[3] The drug still has some use in obstetrics for the control of postpartum hemorrhage, but it has been largely replaced by individual purified alkaloids.[5] Certain alkaloids also have been widely used in the treatment of migraine. The ergot alkaloids can be converted to lysergic acid by subjecting the alkaloid mixture to alkaline hydrolysis followed by acidification.[6]

LSD was first synthesized by Dr. Albert Hofmann, a Swiss chemist at Sandoz Laboratories in Basle, Switzerland, in 1938. However, it was not until April 1943 that Dr. Hofmann discovered its hallucinogenic potential. While working with derivatives of lysergic acid he accidentally exposed himself to a small quantity of lysergic acid diethylamide. In less than an hour he was muddled, confused, and unable to continue his work. He reportedly left the laboratory and returned to his home to rest. He pulled the window shades to block the light because the rays were painful to his eyes. There in the quiet dark of his home he reported having a beautiful experience; thus, his report of LSD's hallucinogenic properties.[3] Another Swiss scientist, Dr. W. A. Stoll, is credited with being the first to systematically investigate the psychological phenomena of LSD.[5] He reported disturbances in perception that led to hallucinations, acceleration of thinking, and slight dimming of consciousness, but without a lessening of judgment. He also found that it was outstanding in producing a clear-cut blunting of the effect and suspiciousness that was often seen in schizophrenic patients. By 1947 Dr. Stoll had completed tests of the drug in both mentally normal and abnormal subjects with no unfavorable after effects.

Meanwhile, in the United States a seed had been planted that would eventually excite a major military interest in the potential use of psychochemical agents.[7] In 1947 Dr. Alsoph H. Corwin, Professor of Chemistry at Johns Hopkins University, wrote the Chemical Corps Technical Command suggesting the potentialities of enzymes as toxicological warfare agents. He offered that with intensive research, it was probable that substances capable of destroying necessary vitamins could be found. The loss of essential vitamins, he opined, held the possibility of producing mass hallucination and uncontrollable hysteria by intoxication.

A year and a half later the Scientific Director, Chemical Corps Technical Command, Army Chemical Center, MD, Dr. L. Wilson Greene, took up Dr. Corwin's theme in a report titled, "Psychochemical Warfare, A New Concept of War."[4] Dr. Greene offered that he was convinced that the trend of each major conflict, being characterized by increased death, human misery, and property destruction, could be reversed. He believed that through psychochemical warfare it would be possible to conquer an enemy without the wholesale killing of his people or the mass destruction of his property. Dr. Greene reported that Dr. Corwin's idea was a major stride forward for mankind, however, he stated that enzymes would decompose with the intense heat created by the explosive charge in munitions or by the heat from most known aerosol devices. Therefore, he proposed a search be made for a stable chemical compound which would cause mental abnormalities of military significance. His report provided a list of 61 materials which were known to cause mental disorders. LSD was not included in his list, which probably indicated a general unawareness in 1949 of the compound by the American scientific community. However, Dr. Greene's study noted that Dr. John P. Clay, Consultant to the Chief, Chemical Division, European Command at Heidelberg, Germany, was aware of Dr. Stoll's investigations in Switzerland with LSD, and he (Dr. Clay) was in a position to monitor future studies that could be beneficial to the psychochemical warfare theme.

Dr. Stoll continued his intense investigation of LSD in Switzerland and by 1949 he had lectured about the "New Hallucinatory Agent" to such gatherings as the Swiss Society of Psychiatry and the Association of Physicians in Zurich.[11] Acclaim of discovery of a major break-through in clinical treatment of mental patients was rapidly growing. The new drug was reported as being very active in unusually low dosage with full recovery in approximately 24 hours. The compound was very expensive, however, and available only from Sandoz Limited of Switzerland. The restricted availability of LSD probably accounts for its delayed introduction into the United States.[4] Even so, in 1950 doctors at St. Louis State Hospital and Washington University Medical School in St. Louis, MO, reported that LSD-25 was a drug that induced a controllable toxic state within the nervous system and that it re-activated anxiety and fear with apparently just enough euphoria to permit recall of provoking experiences. Further, it did not cause the frequently encountered sluggishness of speech associated with other drugs. They opined that LSD offered a means for more readily gaining access to the chronically withdrawn patients and could serve as a new tool for shortening psychotherapy.[8]

A year later (1951) Ypsilanti State Hospital officials reported their experiments which led to the conclusion that lysergic acid diethylamide appeared to be a suitable substance for therapeutic investigation in the treatment of psychoses. It should be noted that in this same time period another aspect of LSD effects was becoming apparent. Specifically, could this or other similar drugs be administered to U.S. officials in order to gain information of national security impact, and what could be done to protect our officials against such an event? This aspect will be explored in greater detail in Chapter 3, concerning the perceived threat.[8]

For the present it is sufficient to state that there was cause for grave concern and a general absence of acceptable answers. In the early 1950s mental institutions, medical schools, and medical research institutions around the world conducted thousands of experiments with LSD in animals and humans. Their findings were published in open literature and used regularly in medical schools and medical association lectures. LSD was determined to be 100 times more toxic or effective than mescaline in treating schizophrenia; a definite aid to psychoanalysis; and a major advancement in the psychotherapy of neuroses. Although LSD was not acclaimed to be a "miracle drug," there were guarded undertones that it could well have that potential. This is evidenced, to a degree, by the wide variety of successful uses of LSD reported. Spring Grove Hospital in Baltimore, MD, recorded measurable success in using LSD to aid in the control and cure of alcoholism. Psychiatrists reported that LSD could surface repressed material and permit greater transference of vital information from patient to psychiatrist. They allowed that one LSD session could replace months of work using the then current techniques.[6]

The British found LSD had great value in dealing with psychopaths. The Canadian Psychiatric Association Journal reported good results with LSD in reversing frigidity and sexual aberrations. American mental hospitals reported that treatment of schizophrenic children with LSD met with some success when all other known methods had failed. Several well known psychiatrists reported that selective, controlled use of LSD enhanced creativity. Several medical hospitals conducted numerous trials with LSD on terminal diseased patients with profound favorable changes in attitude, where pain killers had failed.[6]

Amongst the enthusiasm of a growing use for LSD in the civilian medical community, the military scientific community was continuing its efforts to promote a "humane weapon system" as an alternative to mass destruction by conventional or atomic means.[8,9,10] These forces were joined by the ever present need of the intelligence community to determine an enemy's capabilities for using psychochemical agents as a weapon against our national security.

In what was an apparent effort to pull these forces together, the Department of Defense appointed an "Ad Hoc Study Group on Psychochemical Agents [the Wolff Committee]" in June of 1955. The actions and conclusions of this group will be discussed later in this report. However, it is important to note that at the time the study group met there were at least one hundred major reports available regarding experiments with LSD and other comparable psychochemical substances.[8]

## FOOTNOTES

## CHAPTER II

1. Report entitled, "Selective Malfunctioning of Human Machine, New Horizons in Chemical Warfare," by LTC Douglas Lindsey, November 1959.

2. Edgewood Arsenal Technical Report EATR4210, "The Search for Toxic Chemical Agents," by Dr. Benjamin Witten, November 1969.

3. Article in Scientific American titled, "The Hallucinogenic Drugs," published April 1964.

4. Report entitled, "Psychochemical Warfare, A New Concept of War," by Dr. L. Wilson Greene, August 1949.

5. American Journal of Psychiatry, Volume 108, July 1951-June 1952.

6. Book titled, "The Drug Scene," by Dr. Donald B. Louria, 1968.

7. Report entitled, "The Role of Incapacitating Agents in Warfare, Historical Review," by W. Bobo and B. Witten, dated August 1965.

8. Report of the Ad Hoc Study Group on Psychochemical Agents (Wolff Report), published November 1955.

9. Article entitled, "The Critical Importance of CBR in National Defense," by MG Marshall Stubbs, January 1961.

10. Readers Digest article, "Let's Face the Truth About Gas and Germ Weapons," published in August 1960.

11. Minutes of "First Psychochemical Conference," Army Chemical Center, MD, published by Dr. Amedeo Marrazzi, 12 May 1954.

12. Letter from Army Materiel Command, subject: Hallucinogenic Compounds, dated 22 July 1975.

# CHAPTER III

## THE THREAT

### General

The purpose of this chapter is to provide a rationale for the initiation of research of incapacitating chemical agents.

To understand and evaluate the decisions which resulted in the U.S. Army's entry into and the subsequent proliferation of chemical agent research during the 1950s and early 1960s, it is necessary to first examine the "threat" to the free world as it was perceived at that time. The perceptions must be viewed in the context of the events of the time and the then attitudes of the American people. Of particular importance in this regard was the intensified struggle between the free world and communist world and the generally accepted thesis that supremacy must be maintained in all matters which involved the communist bloc.

At the close of World War II, America was accepted as the only viable major power in the world.[1] In two world wars the seemingly unlimited capacity of America to produce weapons, food, and transport had in each case prevailed over the ingenious new weapons and tactics employed against us. This, and our status as the world power, undoubtedly served to assuage the American people as the demilitarization of our industrial might proceeded and the country returned to a period of normalcy.[2,23] However, national strategists recognized that regardless of the world's horror of war and the expressed desire for peace, war had become more total than ever, since technological advances in warfare assured that in the future entire populations could be affected directly and quickly.[3,6] It was also recognized that although the atomic bomb was credited with destroying Japan's will to fight, 75 percent of the total bombs dropped on Japan's war making capability were chemical incendiaries. With this in mind, it was reasonable to predict that in future strategic planning chemical and biological (CB) warfare measures would join with radiological warfare as matters of primary consideration. However, for a brief period the CB warfare program was dormant in the U.S.[26,20]

The close of the 1940s revealed a new facet of the communist revolutionary movement, which added a new dimension to international conflict and a new term to our lexicon—"Cold War." A United States National Policy of Containment was formulated, and from this new challenges were presented. Even when major conventional forces were not engaged in open conflict, the cold war tactics of propaganda, subversion, guerrilla warfare, and liberation movements or uprisings were being employed. Once it became apparent that the atomic bomb was no longer an American monopoly, it was inevitable that new strategic assessments would have to be made. Rational men obviously would look for other ways to attain national objectives; methods which would not include the strong possibility of national suicide or general war.[4,5]

In early 1951 the U.S. intelligence community learned that Russia was experimenting with a psychotropic drug called "ketjabung"; which, when administered to an unsuspecting victim, was alleged to enable an individual to exercise external subservient control of that person without his victim's subsequent awareness that he had been exploited. Use of this material in interrogation was viewed as a potential threat to our national security.[6] Shortly after U.S. intelligence interest was aroused, two Soviet Bloc agents were seized in West Germany. They were carrying syrettes of a substance which supposedly would lessen an individual's ability to resist the orders of his captors. The captured substance was furnished to chemical laboratories in Europe and the U.S.; however, the exact identity could not be determined, although it was found to be an alkaloid compound. This discovery, and its potential, became more alarming when in the fall of 1951 a prominent doctor from Harvard Medical School reported to the Army Surgeon General that he had learned, during a visit to Europe, that several countries were experimenting with LSD and studying its possible military use.[24] This information, coupled with earlier intelligence findings, heightened the suspicion that the military application of psychochemical drugs was the object of intensive chemical research by our potential enemies.

## USSR - Research and Development

Chemical warfare was not new to the USSR. In 1888 Czarist Russia was among the first of the major powers to recognize the military significance of chemical warfare, particularly mustard gas. In 1899, at The Hague, Czar Nicholas made the unprecedented announcement of the possible employment of projectiles filled with "deleterious gases." The czar's statement created enough concern that the Assembly outlawed the use of chemical filled projectiles.[25] This was the only chemical warfare prohibition to come out of The Hague in 1899. In 1914 the USSR established a chemical warfare research and development capability, three full years ahead of the United States.[7] In 1915 Russia, as with the other Allies, was initially unprepared for the Germans' use of chemical weapons. However, Russia's earlier research was evident when she retaliated, within two months, using mustard, chlorine, and phosgene gases; she was the first of the Allies to do so. By the beginning of World War II Russia was believed to have larger chemical agent stockpiles than any other nation. Some hint of their interest in research in chemical warfare agents was reflected in 1943 when M. I. Kabachnik was awarded the Stalin Prize, 1st Class, for "development of a chemical substance of great significance." German intelligence documents captured after World War II disclosed that the Germans credited

Russia with being fully prepared for extensive chemical warfare, and, in fact, had developed a class of toxic agents not then known to Germany.[25] Some credence is provided to this belief by noting the use Russia made of Dr. Von Bock after World War II. Dr. Von Bock was the production manager of the German Tabun gas plant that was transferred to Russia at the end of the war. Although Dr. Von Bock was captured and taken to Russia along with the plant, he was not employed in the reassemblage of the plant or subsequent chemical agent production. U.S. intelligence considered this as evidence that Russia already possessed ample expertise of her own.[24]

By comparison, in the early 1950s the United States was far behind the USSR in the research and development of chemical warfare agents.[17] In 1952 the Central Intelligence Agency disclosed that the Soviet Bloc had made large purchases of ergot (from which LSD is derived). Also, during this same timeframe the Polish radio urged the people to collect ergot because considerable quantities were needed.[25]

Although American interest in new chemical warfare agents, to include psychochemicals, was intensified during the Korean War, priorities for research and development efforts were necessarily placed on development, improvement, and production of weapons of known immediate value to the war effort as opposed to extensive research of new agents. Thus, chemical research and development efforts were directed primarily toward irritants, smoke, incendiaries, and napalm.[27d] Nevertheless, the USSR and her satellites continuously charged the United States with the manufacture and use of biological warfare agents.[23] These allegations were accompanied by massive propaganda efforts and contrived evidence. Another startling event of the Korean War was the belief that the communists had used drugs in connection with the "brainwashing" of our POWs.[27f] In this regard there was a general belief that the drugs in question were of the psychochemical category. These events, when coupled with our lack of research and development effort in new chemical and biological warfare agents, magnified our comparative backwardness in the field. This is not to state that the military was doing nothing in the area of chemical research and development; there was research being done, but quantitatively the dollar amount involved was quite small, approximately 1/1,000th of the military budget.[27d]

## U.S. Policy

In general, the policy makers and national strategists alike were influenced by the policy on gas warfare formulated by President F. D. Roosevelt, which he expressed as: ". . . I have been loath to believe that any nation, even our present enemies, could or would be willing to loose upon mankind such terrible and inhumane weapons. . . . use of such weapons has been outlawed by the general opinion of civilized mankind. This country has not used them and I hope that we will never be compelled to use them. I state categorically that we shall under no circumstances resort to the use of such weapons unless they are first used by our enemies. . . ."[23] Consequently, decision makers were not willing to expend the needed resources in the development of a weapons capability that had such a remote chance of becoming part of the nation's arsenal. This policy and belief was not without its opponents. Many of the nation's advanced thinkers were openly concerned that the evolutionary and revolutionary forces at work throughout the world had invalidated past judgments. They argued that history had shown many times that a powerful nation could not retain its position by continuing to rely on outmoded concepts.[9] Moreover, they believed that not even a strong economy could win a war from a standing start, when new weapons were available but were not in our inventory.[23] In simpler terms, it is the weapons in being that count the most.

During the 1950s the Roosevelt policy was attacked on its two principal premises. First, chemical warfare is "inhumane." It was argued that psychochemicals could offer a ray of hope for a more "humane" weapons system; that is to say, an enemy could be temporarily incapacitated without harming the surrounding population or industrial capability.[8,10] Secondly, it was argued that if the communists succeeded in attaining a superiority in new chemical and biological weapons which we could not match or which we could not defend against, we would forfeit the option of retaliation.[11,12,15]

The merits of the arguments on either side are not important to this report, however, the fact that such controversy existed at the time is important.

Although research and development in chemical warfare to include the use of human volunteers was authorized and conducted during the 1950s, the public apparently was unaware of either the extent of the Army's research effort or of the capabilities of their potential enemies. Moreover, prior to the late 1950s (1957-1959) there is evidence of only minimal efforts on the part of the military to provide the Congress substantial information regarding chemical warfare research from both the offensive and defensive standpoint.[27] The mass of data reviewed in the preparation of this report indicated that secrecy was maintained for three primary reasons: First, the lack of definite knowledge of exactly what our enemies already knew or had in their own arsenals; second, the natural revulsion against the effects of both old and new CBR agents made them natural targets for international propaganda campaigns; and third, was the concern that the American people would express repugnance with the Army's involvement in this type of warfare preparation, rather than accepting the need for research, if for no other reason than to learn how to protect our population in the event of a chemical attack. This later perception was highlighted in a speech by a former deputy director of Defense Research and Engineering in 1959 when he said: "At the present time I might say the Soviet Union seems to be ahead of us in the field of chemical and biological weapons for military use, as well as in the field of civil defense against these weapons. The apparent American reluctance to think about and face up to the realities and potentialities of biological and chemical weapons might give an enemy an absolutely crucial military advantage over us, unless we take steps immediately to rectify our military and civil defense posture, vis-a-vis the biological and chemical weapons capabilities of our potential enemies. . . ."12

Serious open acknowledgement of America's chemical/biological civil defense readiness appeared to come into focus in 1958. The suddenness with which ample file documents and public literature appeared leads to a conclusion that the opponents of secrecy had been struggling for some time to present their case to Congress and the general public. Their motivation seemed to stem from concern for the public welfare and a desire to influence a more flexible national policy. In early 1958 the Chief of the Army Chemical Corps offered that since 1948 U.S. national policy had been based on nuclear deterrence. He stated that "the U.S. had been involved in 17 wars during that ten-year period and won none of them, nor had nuclear weapons been used in any of them." In the meantime, he reported, communism had increased its geographical and population control by 600 percent. Moreover, he opined that psychochemicals and their non-lethal effects were ideal for Russian use against the United States because they would allow for the capture of undamaged American industry and the manpower resources to operate it.[14] His theme was adopted by many scientists, legislators, and military planners.[13] In late 1958 the new Chief of the Army Chemical Corps promoted the "Blue Sky Program," which was designed to seek new and novel ideas from chemists throughout the nation. Eight months later the U.S. Army Chemical Corps Advisory Council (an assemblage of some of the nation's leading scientists) reported that the U.S. was seriously lagging behind the USSR in chemical warfare readiness. They reported: that the USSR was prepared for large-scale chemical and biological warfare, both overtly and covertly; USSR chemical agent production schedule was three or four times that of the U.S.; the USSR had started production of V-agents in 1956 while the U.S. would not start until 1960; the USSR started production of G-agents in 1947 and the U.S. started in 1954; Russia had stockpiled 215,000 tons of chemical agents as compared to 31,000 tons by the U.S.; and Russia's chemical service employed 100,000 men while the U.S. had 5,000. Furthermore, the Council found that the USSR had a decided advantage because the U.S. and its allies had little or no chemical/biological defense system.[17]

Those findings were reinforced by the results of a Booz-Allen Applied Research, Inc., research project which had been contracted to determine the extent of USSR efforts in chemical and biological warfare and the U.S. defenses against that type warfare. Booz-Allen reported that the

USSR was concerned with CB warfare and it could be their future prime effort. Another finding was that the U.S. was without effective CB countermeasures or alert system. Additionally, they found that the research required to correct the deficiency was not being conducted.

CBR Research

During this period the need for more research was often the subject of major news articles: The Army Information Digest published Attack by Invisible Invader;[8] U.S. News and World Report published New Worry for World;[9] The Reporter published The Campaign to Make Chemical Warfare Respectable;[16] the Baltimore Sunday American and News Post published a series of four articles entitled Plan to Alert Nation on Invisible Death, US Wide Open to a Surprise Gas-Germ Raid, Gas, Biological Warfare Threat to U.S. Now, and U.S. Has Few Ways to Spot Cloud of Death;[18] and the Readers Digest Association, Inc., published Let's Face the Truth About Gas and Germ Weapons.[20] These are a small sampling of the material published on the subject. The theme generally was the same; the Russians were ready and willing to conduct CB warfare and the U.S. was not, thus, national security was in jeopardy. The Congress, both the House and Senate, conducted hearings at the committee level on this subject. The House of Representatives subcommittee on appropriations received testimony regarding chemical and biological research and related matters in March 1958, April 1959, March 1960, March 1961, and March 1962. The House Committee on Science and Astronautics received extensive testimony in January 1959 and submitted a comprehensive report to the House of Representatives titled: Research in CBR (Chemical, Biological and Radiological Warfare).[23] The recommendations offered by this committee in their report appeared to represent the culmination of a decade of salesmanship efforts by the chiefs of the Chemical Corps and their supporters; therefore, they bear repeating in this report. The report concluded:

> As a result of its hearing and further study on the problems of research in CBR, this committee offers the following recommendations:
>
> (1) There must be a strong and continuous intelligence effort conducted by the United States as a protective measure to keep abreast of foreign developments in the fields of CBR if this country is to have time to develop adequate passive defense and other countermeasures.
>
> (2) Surveillance of foreign activities might also give this nation its only inkling of imminent use of CBR against the United States, and therefore is important for this reason too.

(3) There is an urgent need for greater public understanding of the dangers and uses of CBR if proper support is to be given to our defenses and countermeasures.

(4) In any consideration of international disarmament, a special effort must be made not to overlook the great potential of CBR and the ease of evading detection of CBR activities.

(5) There is an urgent need for higher level of support on a continuing, long run basis in order to develop better detection and protection measures against possible employment of CBR against this country.

(6) Civil defense plans of this country should include a more positive effort at providing shelters which are proof against CBR attack, at providing more masks and protective clothing, and in public instruction in defensive measures.

(7) More positive and imaginative attention should be given to the problems of detecting and guarding against use of CBR by saboteurs aimed at disrupting key activities in time of emergency.

(8) The committee views CBR as a weapon which is not competitive with nuclear weapons, but complementary to them, designed to do a different job.

(9) The committee cannot bring itself to describe any weapon of war as "humane," and makes no moral judgment on the possible use of CBR in warfare. It does recognize that ignoring CBR will not remove the problem of its existence or its possible employment against the United States.

(10) It is granted that some forms of CBR offer the prospect and the hope of winning battles without taking human life or destroying homes and factories. If force must be used, this is better than many of the alternatives. But it must also be recognized that even if the US is attacked with the new "gentle" weapons, the consequences of any defeat for our nation would be just as dangerous to our national goals and life.

(11) It is also recognized that in the present world situation with other countries pursuing vigorous programs of CBR development, the best immediate guarantee the US can possess to insure that CBR is not used anywhere against the free world is to have

a strong capability in this field, too. This will only come with a stronger program of research.

(12) At the present time, CBR research is supported at a level equivalent to only one one-thousandth of our total defense budget. In light of its potentialities, this committee recommends that serious consideration be given to the request of Defense officials that this support be at least trebled. Only an increase of such size is likely to speed research to a level of attainment compatible with the efforts of the communist nations.

(13) If CBR is to be considered a deterrent force in the US arsenal of weapons, the program of research advocated here will have to be accompanied by an adequate program of manufacture and deployment of CBR munitions.

(14) CBR warfare is not particularly expensive as compared with many other modern forms of warfare, particularly when considered as an incremental cost added to already necessary delivery techniques employed for nuclear weapons. This is a further reason why this investment must be given careful consideration.

(15) The research being done in CBR has already yielded a variety of peacetime benefits, including antidotes for poisons, new serums to prevent disease, greater understanding of how diseases are spread, new insecticides, and fundamental knowledge of life processes. There is no real separation possible between potential military application of chemical and biological knowledge and peaceful applications. These peaceful applications are required in any case and deserve added support for the national welfare.

(16) The United States is in a research and development race, particularly with the Soviet Union, whether it be for peaceful or military purposes. The study by this committee of CBR reinforces our general view of the urgency of the overall race and necessity of full public understanding and support of science and technology everywhere in our nation.

The Senate Armed Services Committee, in its February 1962 hearing, considered many of the same aspects as the House had two years earlier.

It is important to note that Defense officials and Congress were not alone in their concern for improved CBR research and public awareness of the threat. In October 1959 the American Legion adopted a resolution to achieve an impressive military capability in CBR warfare. Also in October 1959, the American Chemical Society Board Committee on Civil Defense published a finding that declared the US was following a CBR policy of "Head in the Sand." They went on to claim that the American people were uninformed as to the dangers of chemical attack, that there was a lack of CBR deterrent weaponry. The American Chemical Society, with 88,000 members, was often credited by the news media with removal of the lid of secrecy that surrounded the need for adequate CBR civil defense measures.[17] Unquestionably, the American people were beginning to get the word through the media, congressional hearings, defense public relations efforts and a wide variety of speeches to such assemblages as the Chemical Corps Protective Committee, the Robert A. Welch Foundation, American Chemical Society, Armed Forces Chemical Association, Compressed Gas Association, Office of Defense Mobilization, American Medical Association, and the American Ordnance Association. The messages they received were similar: the U.S. was not ready to defend itself against a chemical warfare attack; the fear of an exchange could inhibit the Soviets from using atomic weapons if other means could achieve their purpose; Soviet planners were quoted as saying, "in the future, war will be distinguished from all past wars in connection with mass employment of Air Force devices, rocket weapons and varius means of destruction, such as atomic, hydrogen, chemical and bacteriological weapons"; Soviet forces, with 175 ready divisions, had chemical troops at all echelons and were prepared to participate in large-scale gas warfare; and Major General Drugov of the Soviet Army was quoted as saying, "special interest attaches itself to the so-called psychic poisons (mescaline, methedrine, and lysergic acid derivatives) which are now used for simulation of mental disease."[23] The speeches also contained such alarming statements as: any major military power can manufacture nerve gas or a comparable material at the rate of hundreds of tons per day; the American civil population is without protective masks or training in their use; America cannot afford to ignore the real possibility that even more powerful chemical weapons than nerve gases remain to be discovered; and America may not know the type of chemical warfare agent an enemy may choose to employ on our forces until we are on the battlefield, thus our research must be complete.[19,21,22]

## New Policy

A change in policy regarding chemical warfare appeared inevitable by the time President Kennedy took office. The Kennedy administration asked for a wider choice of responses shortly after taking office and Defense research and development officials turned their efforts toward a "Balanced Arsenal--Balanced Power" effort.[21] With this new policy came the proliferation of chemical research and development to address both the offensive and defensive needs of our national security.

## FOOTNOTES

## CHAPTER III

1. Notes of Joint Intelligence Council Meeting, 1952.

2. Chemical Corps Protective Committee Report, March 1959.

3. U.S. Army Chemical Corps Advisory Council Report, July 1959.

4. Speech to Robert A. Welch Foundation by MG Stubbs, 20 January 1961.

5. Intelligence Branch Study on Policy and Trends in USSR with Respect to Offensive Chemical Warfare, 1 January 1955.

6. Intelligence Branch Study of Chemical Warfare, Office of Chief Chemical Officer, Department of the Army, November 1954.

7. Ad Hoc Advisory Committee of Chemical Corps Mission and Structure (Miller Report), August 1955.

8. Army Information Digest, "Attack by Invisible Invader," by MG Creasy, February 1958.

9. U.S. News and World Report article, "New Worry for World," May 1958.

10. Text of speech, "CBR Warfare in Focus," by MG Creasy.

11. Same as Footnote 22.

12. Speech titled, "This is the CW Threat," by Dr. William H. Summerson, 8 April 1960.

13. U.S. Senate, Congressional Record, remarks by Honorable Alexander Wiley of Wisconsin, 30 January 1958.

14. Remarks to Compressed Gas Association titled, "Should We Worry About C&B Warfare," by MG Creasy, January 1958.

15. Remarks to Armed Forces Chemical Association by MG Stubbs titled, "CBR A Power for Peace," April 1959.

16. Article by The Reporter titled, "The Campaign to Make Chemical Warfare Respectable," October 1959.

17. Report by American Chemical Society, Board Committee on Civil Defense, 19 October 1959.

18. Series of articles by Baltimore Sunday American and News Post titled, "Plan to Alert Nation on Invisible Death"; "U.S. Wide Open to a Surprise Gas-Germ Raid"; "Gas, Biological Warfare Threat to U.S. Now"; and "U.S. Has Few Ways to Spot Cloud of Death," January 1960.

19. Speech to American Medical Association titled, "Medical Importance of CBR Warfare," by LTG Heaton, The Surgeon General of the Army, 30 June 1960.

20. Readers Digest article, "Let's Face the Truth About Gas and Germ Weapons," August 1960.

21. Speech to Armed Forces Association, "Balanced Arsenal-Balanced Power," by MG Stubbs, September 1961.

22. Speech to American Chemical Society, "This is the New CBR Perspective," by MG Stubbs, 8 April 1960.

23. House Report #815, The Committee of Science and Astronautics, The House of Representatives, The Congress of the U.S., 86th Congress, 1st Session.

24. Intelligence Staff Study, "Soviet R&D Capability for Toxic Agents," July 1958.

25. Office of Scientific Intelligence, CIA report on "Soviet Efforts to Develop New Chemical Warfare Toxic Agents," October 1960.

26. Meeting Notes of the American Chemical Society, "History of Chemical Corps," 19-20 May 1958.

27. Congressional record of testimony:

House of Representatives:
a. Subcommittee on Appropriations, 86th Congress, March 1960.
b. Appropriations Committee, 87th Congress, March 1962.
c. Appropriations Committee, 85th Congress, March 1958.
d. Appropriations Committee, 86th Congress, April 1959.
e. Appropriations Committee, 87th Congress, March 1961.
f. Science and Astronautics Committee, 86th Congress, June 1959.
g. Foreign Affairs Committee Report, May 1970.

Senate:
h. Armed Services Committee, 87th Congress, February 1962.
i. Foreign Relations Committee, 91st Congress, April 1969.

# CHAPTER IV

# THE DERIVATION OF AUTHORITY

## General

The purpose of this chapter is to present the authority for the conduct of chemical warfare research with human subjects; to describe the procedures that governed the conduct of research with humans; and to discuss the interpretations of authority for the conduct of incapacitating agent research which existed at the time.

This chapter will cover the origins of medical research restrictions for the Army. It also covers the extremely high level at which decisions were made and the lengthy and thorough staffing that preceded the granting of authority to use human volunteers in research. Finally, it will include discussion of the several occasions when research was conducted without proper authority or when authority was incorrectly granted.

## Chemical Corps Medical Research and the Use of Human Subjects

Just as in the history of medicine, human experimentation appears to have been an integral part of the history of the U.S. Army chemical warfare research efforts. On 28 June 1918 the President of the United States directed the organization of the Chemical Warfare Service (CWS), National Army, under the Secretary of War.[1] The CWS was created by merging the Chemical Service Section, National Army, the Chemical Element of the Ordnance Department, and the Sanitary Corps of the Medical Department. Four years later, in October 1922, the CWS created a Medical Research Division to conduct research directed at providing a defense against chemical agents.[2] Part of the defense was the provision of therapeutic and prophylactic measures. The scientists apparently shared a common belief that no matter how exhaustively an agent was tested in animals, if it was intended to protect or heal man, its efficacy had to be proved in man.

The scant evidence available for this period indicated that for the next 19 years the subjects used in various tests of mustard, phosgene, and many other chemical agents were volunteer employees of Edgewood Arsenal.[3] This expedient arrangement reportedly sufficed because the experimental staff was too small to generate experiments requiring large numbers of human subjects. However, available documents reflected that in early 1941 the threat of war caused greater urgency for the development of protective items. Consequently, the need for a larger source of volunteers also developed. The first recorded recruiting arrangement was a request made to all technical and officer personnel at Edgewood Arsenal to signify their willingness to participate in various tests; a method which was soon reported as unsatisfactory.[3] Generally, it was considered that repeated exposure to agents was hazardous because the cumulative effects of the compounds were not known; sensitizing employees to compounds they had to work with in the course of their normal duties basically was unproductive; many of the volunteers because of their technical qualifications had preconceived opinions as to the reactions they should have to certain agents and thus were not completely objective or unbiased in their reporting; test results were subject to invalidation due to the lack of testing on a valid random population basis; and a concern that the fear of censure by co-workers motivated many of the volunteers.

This period was characterized by an absence of any evidence which would indicate who authorized the use of human volunteers, or if it was a point of concern. It was apparent that if a source of authority did exist, it probably was informal and rested with the local commander. The first indication of formal authority to recruit and use volunteer subjects in chemical warfare experiments was in 1942. Specifically, in June 1942 records reflected that the Secretary of War was requested to rule on the permissibility of using enlisted men for detail testing of mustard type agents. Reportedly, the Acting Secretary approved the test in principle and authorization was granted by The Adjutant General of the Army in the name of the Secretary.[5] This authority was followed by large-scale human experimentation at Edgewood Arsenal, as well as at field laboratories located at Camp Siebert, AL, Bushnell, FL, Dugway Proving Ground, UT, and San Jose Island. The testing programs continued throughout the war years. It also was reported that this authority was not rescinded. Subsequently, during the early 1950s this original authorization was again used for the conduct of tests at Dugway Proving Ground which involved exposing human volunteers to mustard type agents.[4] It must be noted that the evidence concerning tests involving mustard agents following World War II was a single documentary reference, uncorroborated by any other evidence.

In July 1943 the Chemical Warfare Service (CWS) was assigned responsibility for all medical research involved in the field of chemical warfare. This adjunct to the CWS mission included toxicological research and the investigation and study of hazards to the health of Chemical Warfare Service personnel.[5] With the end of World War II the immediate requirement for volunteers temporarily was diminished. There were indications that the laboratories at Edgewood Arsenal reverted to the old practice of using local assigned personnel to meet their volunteer needs. This does not imply that the end of World War II curtailed the research activity of the Chemical Corps. On the contrary, the frightening revelation that Germany had stockpiled certain organic phosphate compounds (nerve gases) that were far more deadly than the chemical agents in the Allied arsenal, developed a new series of challenges for the Corps. Discovering methods to counteract the lethal effects of these compounds became a primary goal of medical research. However, American researchers were unable to locate any usable research evidence that the Germans had conducted meaningful human experimentations with the nerve agents. Thus it was necessary to spend the next several years confirming German research data by animal experimentation and by compiling sufficient information to determine the safe experimental dose for man.[3] When the necessary animal experiments had been concluded and the Chemical Corps investigators were confident of their ability to safely conduct experiments in man, the question again surfaced as to where the volunteers would come from.

## Authority to Use Volunteers

During this period, the rules governing the use of humans had undergone major changes. The first of these changes was the Nuremberg Military Tribunals, following World War II, which produced a set of firm rules for the conduct of medical research. They were known as the "Nuremberg Code of 1947," and it established 10 specific rules intended to govern the use of humans in the conduct of medical experimentation.[6] Since this Code became the foundation for future guidance to researchers, its essential elements are repeated in this report:

> 1. The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, overreaching or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved so as to enable him to make an understanding and enlightened decision. This latter element requires that before the acceptance of an affirmative decision by the subject there should be made known to him the nature, duration and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment. The duty and responsibility for ascertaining the quality of the consent rests with each individual who initiates, directs or engages in the experiment. It is a personal duty and responsibility which may not be delegated to another with impunity.

2. The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature.

3. The experiment should be so designed and based on the results of animal experimentation and a knowledge of the natural history of the disease or other problems under study that the anticipated results will justify the performance of the experiment.

4. The experiment should be so conducted as to avoid all unnecessary physical and mental suffering and injury.

5. No experiment should be conducted where there is an a priori reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects.

6. The degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment.

7. Proper preparations should be made and adequate facilities provided to protect the experimental subject against even the remote possibilities of injury, disability or death.

8. The experiment should be conducted only by scientifically qualified persons. The highest degree of skill and care should be required through all stages of the experiment of those who conduct or engage in the experiment.

9. During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible.

10. During the course of the experiment the scientist in charge must be prepared to terminate the experiment at any stage, if he has probable cause to believe, in the exercise of the good faith, superior skill, and careful judgment required of him that a continuation of the experiment is likely to result in injury, disability, or death to the subject.

The second major change occurred in 1950, with the introduction of legislation governing the organization of the U.S. Army. The initial statutory authority for the Army to conduct research and development was housed in the Organization of the Army Act of 10 July 1950. Section 104 of the Act

(74 Statute 322; 5 USC 235a) held that: "The Secretary of the Army is authorized to conduct, engage, and participate in research and development programs related to activities of the Army of the United States and to procure; or contract for the use of, such facilities, equipment, services, and supplies as may be required to effectuate such programs."[7] It appears that this was the first time the Congress placed into law control over research and development activities and further vested the responsibility and authority for such programs with the service secretary. It further appears from this Act that the Congress recognized research and development functions as an integral part of the Army's role.

At this point in history there are two separate, yet related, actions impacting on research: the Nuremberg Code of 1947 and the Organization of the Army Act of 1950. Although there is little in the way of documentary evidence to indicate general knowledge or recognition of the impact of these actions, it does appear that authority for future use of humans in research would require observance of the Nuremberg Code and also would require authorization by the service secretary. However, no documentary evidence was discovered which indicated that the secretary either delegated his authority or established directives or guidelines to preclude research involving human subjects without his authorization. In fact, there was a notable lack of policy one way or the other between 1950 and 1952.

## Early Policy Guidance

The matter of the use of human volunteers was under deliberate consideration by the Armed Forces Medical Policy Council during the first two years of the 1950s. In the fall of 1952, following extensive study, the Council reported to the Secretary of Defense that researchers had reached the point beyond which essential data could not be obtained unless human volunteers were utilized. Thus, they recommended that the Secretary of Defense establish a policy that would authorize the use of humans in medical research.[8] They further recommended that the Nuremberg Code of 1947 be cited as the principal guidance to the services. However, they urged that three articles of the Code be modified. The first of these recommended modifications was that Article 1 require the volunteer's consent to be in writing and his signature witnessed. Secondly, they recommended that Article 5 be modified to delete the final phrase "except, perhaps, in those experiments where the experimental physicians also serve as subjects," thereby leaving the entire article to read: "No experiment should be conducted where there is an a priori reason to believe that death or disabling injury will occur." Finally, they suggested that an additional rule be added which would prohibit the use of prisoners of war as volunteer subjects.

Based upon a recommendation of the Armed Forces Medical Policy Council that human subjects be employed as the only feasible means for realistic evaluations and/or development of effective preventive measures of defense against atomic, biological, or chemical agents, the Secretary of Defense, by a memorandum to the service secretaries, established a policy governing the use of human volunteers. The memorandum, dated 26 February 1953, was classified "TOP SECRET" and provided the following: each service secretary was authorized to use human volunteers in experimental research connected with the development of defenses of all types against atomic, biological and/or chemical warfare agents; provided specific guidance and safeguards concerning the use of human volunteers, which included the rules as set forth in the Nuremberg Code, as modified by the Armed Forces Medical Policy Council; required that in each instance in which an experiment was proposed pursuant to the memorandum that the nature and purpose of the proposed experiment (protocol) and the name of the person to be in charge of the experiment shall be submitted for approval of the service secretary; required that the service secretary approve, in writing, the proposed experiment and the person to be in charge of the experiment; and required the service secretary to inform the Secretary of Defense of each approved research proposal.[8]

Although there was no evidence that the Chemical Corps Research Laboratories were provided advance information concerning the forthcoming guidance on the use of human volunteers in research, there was evidence that the underlying principles of the "Wilson Memorandum" were known and were the subject of detailed discussions long before Department of the Army published an implementing directive. In this regard, the Medical and Related Problems Committee of the Chemical Corps Advisory Council met at the Army Chemical Center (now Edgewood Arsenal), on 20-21 March 1953, to discuss the impact and implementation of the rules established at the Nuremberg Trials and accepted in modified form by the Secretary of Defense in February 1953. In attendance at this meeting were the prominent civilian doctors who constituted the committee, legal and medical advisors to the Chief, Chemical Corps, representatives from the medical and biological laboratories, and representatives of intermediate chemical research commands.[4] The report of this meeting was significant because it indicated the existence and use of an alternate to normal command channels for the dissemination of Army policy within the Chemical Corps. Although the "Wilson Memorandum" was dated 26 February 1953, the Army's implementing instructions to that memorandum had not been published or announced at the time of the conference. Nevertheless, the Council, in anticipation of an Army policy, advanced local interpretations that later would be germane in the execution of the policy. The depth of knowledge held by the participants regarding problems associated with the use of humans in research is probably best explained by recognizing the key positions they occupied in the Chemical Corps organization and, in some instances, overlapping membership in other advisory councils within the armed forces. Some of their interpretative conclusions are worthy of mention at this point, even though most will be discussed later in this and subsequent chapters. They concluded that it was important to differentiate between hazardous and nonhazardous experiments. In their opinion this differentiation was essential since they agreed that only protocols for hazardous experiments need be submitted for approval. In this light, they reported that gas mask training during which men passed through a chamber with a high concentration of mustard gas would be considered nonhazardous and "in the line of duty." Another consideration was an effort to seek blanket type approval for experiments already being conducted, thus simplifying an anticipated problem of obtaining approval for specific hazardous experiments. The participants agreed that the most controversial legal aspect was to determine what constituted voluntary consent. The conferees noted that the important considerations in this regard were: the age of the volunteer; mental capacity; and the amount of information which must be provided in advance of obtaining the signed volunteer statement. Additionally, it was opined that any form of coercion, mental, physical, or material, must be avoided. Further, they considered military volunteers as presenting a particularly sensitive problem since soldiers were imbued with a sense of obedience and readily could be placed in a position where the experiment was made to appear as a military duty and thus something the volunteer could not refuse.

Two months later, in May 1953, the Army Staff presented the Secretary of the Army with a proposed directive to implement the "Wilson Memorandum." Although the Secretary agreed in principle with the proposed instructions to the field, he rejected the initial proposal because it was restricted to biological agent research rather than chemical, biological, and radiological agents and because he believed that the "TOP SECRET" classification should be downgraded in order to make the instructions more readily available to subordinate elements that would be conducting the research. Evidence indicates that the first guidance to the Army Staff was published on 30 June 1953.[11] This memorandum, which was addressed through the Assistant Chief of Staff, G-4, to the Army Chief Chemical Officer and The Surgeon General, was titled: "Use of Volunteers in Research," and was to be referred to as "Chief of Staff Memorandum 385 (CS:385)." Its purpose was to provide policy and procedures for the use of volunteers in atomic, biological, and chemical research. In addition to transmitting the 11 rules contained in the "Wilson Memorandum" and legal considerations for researchers, it also directed that no research of atomic, biological, or chemical agents using volunteers would be conducted without the specific written approval of the Secretary of the Army. Moreover, it directed that proposals for such research would be forwarded to The Surgeon General of the Army for his review and mandatory comment prior to presentation to the Secretary for approval. The memorandum, as published, did not differentiate between hazardous and nonhazardous experiments as a consideration of whether to obtain Secretary of the Army approval, rather, it specified that all atomic, biological, and chemical agent experiments which used human subjects would be submitted. The document search failed to disclose any documents which provided additional guidance qualifying or limiting the type of experiments requiring approval. Such guidance normally would have been transmitted through the Office of the Chief Chemical Officer to the Commander of the Chemical Corps Research and Engineering Command located at what is now Edgewood Arsenal. Records do indicate that on 24 July 1953, after receiving guidance from the Chief Chemical Officer, the Commander of the Chemical Research and Engineering Command notified the Commander of the Chemical Corps Medical Laboratories that the policies and procedures set forth in Chief of Staff Memorandum 385 were effective immediately and would govern the use of volunteers in all present and future experimental research.[12] The Commander also directed that research plans and requests for approval to conduct experiments using human volunteers be submitted by 7 August 1953, and that until such time as new approval was granted all experimentation using volunteers would be stopped. This action directed immediate compliance without exception to the new policy.

Initial Request to Use Volunteers

On 7 August 1953 the Medical Laboratory Commander submitted a request for approval to conduct seven research projects. Although not specifically stated, it was implied that these experiments had been in progress at the time the 24 July 1953 letter was received. The seven research projects for which approval was requested were:

a. Retention of nerve gas vapor in human respiratory tract.

b. Behavior of nerve gas liquid on the human skin.

c. Effects of nerve gas on the nervous and mental functions in man.

d. Effects of nerve gases and of therapeutic agents on visual efficiency.

e. Evaluation of candidate therapeutic agents in man.

f. Sensory threshold effects of phosgene oxime in man.

g. Comparative effects on skin of vesicant liquids, vapors, and aerosols.[13]

The Medical Laboratory Commander in his request for approval of the research plans included his interpretation that the "use of volunteers in research" applied to the exposure of individuals to the hazards of toxic chemicals, whether they were standard or candidate chemical warfare agents, or standard or chemical therapeutic agents. The Laboratory Commander expressed an assumption that the Chief of Staff directive requiring Secretary approval did not include studies of the physiological aspects of protective material, including the protective mask, since such studies did not have to involve exposure to toxic chemicals.

The Commander, Chemical Corps Research and Engineering Command, the Chief Chemical Officer, and The Surgeon General reviewed the proposed plan and recommended to the Secretary that it be approved. The Surgeon General in his comments provided an opinion that the provisions of the Chief of Staff Memorandum 385 would apply in the event toxic chemicals were used in gas mask tests. A memorandum to Chief of Staff, dated 5 November 1953, signed by the Secretary of the Army, Robert T. Stevens, granted approval to conduct the requested research programs using human volunteers.[14] A synopsis of the Chemical Corps plan, which listed the seven investigative studies, was attached as an inclosure to the approval memorandum and contained a statement to the effect that the basic directive did not include studies of the physiological aspects of protective materials, including the protective function of the gas mask, unless such studies included exposure to toxic chemicals. Although the copy of the Chemical Corps plan referred to in the Secretary of the Army's memorandum could not be located, other documents indicated that the approved plan contained basically the same data submitted by the Medical Laboratory on 7 August 1953. Further support of that contention was contained in a 24 December 1953 letter from the Office of the Chief Chemical Officer to the Commander, Chemical Corps Research and Engineering Command, in which approval of the request of 7 August 1953 was granted. This particular letter approved all seven investigative study requests without modification or qualification; it confirmed the assumption that studies involving physiological aspects of protective material were not within the intent of the Chief of Staff Memorandum 385, unless exposure to toxic chemicals was involved; it directed that Army contractors must abide by the same basic principles and safeguards governing military researchers; and it specified that the fact that the Chemical Corps was using human volunteers in research was, of itself, unclassified.[15] This downgrading of classification apparently was attributable to the Secretary's earlier concern about the level of classification, which culminated in a Secretary of the General Staff Memorandum, dated 16 October 1953, downgrading Chief of Staff Memorandum 385 from "TOP SECRET" to "CONFIDENTIAL."[16] It appeared that the initial high classification afforded the subject may have been partially responsible for the lack of complete documentation and for early misinterpretations of the policy.

Policy interpretations are mentioned at this time because there was evidence that at least one research project was not terminated pending submission and approval of the research plan in accordance with Chief of Staff Memorandum 385. Specifically, an operation code named "TOP HAT" was conducted at the Chemical Corps School, Fort McClellan, AL, between 15 and 19 September 1953.[17]

This research project, which was termed a "local field exercise," involved the use of Chemical Corps troops in testing methods of decontaminating biological warfare agents, mustard gas, and nerve gas. A review of the scant literature available on the exercise indicated that it was conducted in contravention of the intent of the Department of Defense and Department of the Army policies. While it is possible that a separate request for approval may have been submitted and subsequently retired and/or destroyed, it is more logical to assume that the project was considered to fall within a "line of duty" exercise for Chemical Corps troops and interpreted as not subject to the provisions of policies governing the "use of volunteers in research." This conclusion is not offered as an excuse for an exercise in which soldiers were exposed to toxic chemical agents without proper authorization and without their consent, but rather to emphasize the extreme difficulty of attempting to implement a complex policy by means of a relatively simple, but highly classified directive.

Another observation of import concerns the seven investigative studies which were forwarded for approval and which appeared to be a request for approval of experiment with a "class" of drugs rather than a request for research involving a specific chemical agent. For example, the first of the seven investigative studies, "Retention of Nerve Gas Vapor in the Human Respiratory Tract," failed to specify which of the several available nerve gas agents would be used and under what circumstances. Since the nerve gas agents varied significantly in toxicity, it would appear extremely difficult for The Surgeon General to conduct a thorough evaluation of the proposal without knowing the specific chemical nerve agent to be used in the experiment. Again, there may have been additional correspondence and conferences answering these various questions about the agent to be used and the emergency treatment measures to be available on site prior to The Surgeon General recommending approval, however, no records of such were found. Thus, the available records gave the impression that the submission of the initial request amounted to nothing more than a perfunctory action for the purpose of obtaining blanket approval for ongoing research projects.

## Medical Volunteer Program

By 1954 the Chemical Corps had established a framework within which to conduct human experimentation, however, they lacked an adequate pool of volunteers. There were indications some experimentation was being conducted using enlisted personnel assigned to Edgewood and technicians assigned to the laboratories. However, this source was extremely limited and could not support the type research program envisioned.

In 1955 it was decided that the most practical source of volunteers would be enlisted men stationed at Army installations in the vicinity of Edgewood Arsenal. The Medical Laboratories formed an orientation team to visit Second Army Headquarters at Fort George G. Meade and solicit the support of the commander. The mission was successful. In April 1955 HQ, Second Army, published a directive to its major installation commanders encouraging them to publicize the program in an attempt to provide Edgewood Arsenal 20 volunteers each month for a period of 30 days temporary duty (TDY).[18]

The first contingent of 16 soldiers from Second Army Headquarters arrived at the Army Chemical Center (Edgewood Arsenal) on 2 May 1955.[19] For a brief period it appeared that the Medical Laboratories had established a complete, viable program, i.e., authority to use humans in research; a proper medical staff to conduct the research; and a steady supply of volunteers. However, within a few months more urgent priorities for Second Army's personnel resources inhibited the flow of volunteers.[3] In an effort to overcome this shortfall, the Chief Chemical Officer requested the support of the Quartermaster General, the Chief, Corps of Engineers, the Chief of Ordnance, and the Chief Signal Officer. This action resulted in volunteers coming from Fort Knox, KY, Fort Lee, VA, Fort Eustis, VA, Fort Belvoir, VA, Fort Monmouth, NJ, and Aberdeen Proving Ground, MD, in addition to those already committed by Fort Meade.

## Psychochemical Drugs

On 7 September 1955 the Commander of the Medical Laboratories formally requested permission to use volunteers in research involving nonlethal psychochemicals.[20] His request, titled, "Additional Use of Volunteers in Research," was submitted to the Commanding General, Research and Engineering Command, who concurred in the request, as written, and forwarded it to the Chief Chemical Officer, Department of the Army.[21] Prior to the request being prepared and forwarded, there was a considerable body of research data concerning the effects of psychochemicals on humans available to the Chemical Corps Medical Laboratory, to include data obtained as a result of actual experimentation conducted by civilian hospitals and universities working under Army contracts.

Some of the events which preceded this request had a direct bearing on it and on subsequent actions involving psychochemicals. Several months prior to the Medical Laboratories' request to use volunteers in psychochemical research, the Chairman of the Technical Advisory Panel on Biological and Chemical Warfare, Office of the Assistant Secretary of Defense (R&D), appointed an "Ad Hoc Study Group on Psychochemical Agents" to evaluate the military potential of this type of chemical warfare. Their report, known as the "Wolff Report," after the name of the committee chairman, was published in November 1955 and presented specific recommendations for the conduct of future research involving psychochemical agents.[22] The committee concluded that experiments with psychochemical agents, of which LSD appeared to be the most promising, should be carried out with volunteer units as soon as practicable. In this regard, the Study Group also prepared and recommended the implementation of a detailed plan for the conduct of small unit experiments. Reference to the "Wolff Report" was necessary at this point because a review of the actions surrounding the submission of the September 1955 request for "Additional Use of Volunteers" gave the impression that staffing of the request was held in abeyance pending release of the report. It apparently was known beforehand that the Study Group would not only favor testing of psychochemicals on humans, but also would recommend that tests be conducted to determine the drug's effect on small military unit operations. Records also indicated that several months prior to the September 1955 request being approved, advance planning was underway to implement the testing of small units, as recommended by the "Wolff Report."

In January 1956 the Office of the Assistant Chief Chemical Officer for Planning and Doctrine reviewed the "Wolff Report" and commented on the recommendation which proposed that, prior to a military group being administered LSD, they should be given a carefully prepared training lecture on the effects of LSD. The reviewer stated that: "in view of the fact that a great many of the effects observed in the group may be the result of suggestion (placebo effect) it would appear desirable to have one control group which has neither been given a training lecture on LSD-25, nor any information as to the symptoms of the drug being administered. Symptoms due to suggestion would thus be reduced to a minimum and at the same time a more realistic combat situation would be utilized since it is assumed that enemy personnel, under combat conditions, would not have recently been briefed on the effects of LSD-25."[23] It is not known whether the reviewer in this instance would have caused the drug to be administered to all of the volunteers or to selected members of each group. Implicit in the comment, however, is the theme that, from the military standpoint, a lack of knowledge on the part of the volunteer was necessary for a realistic experiment. Neither the correctness of the comment nor the value of the added realism is at issue. What is involved is that in spite of clear guidelines concerning the necessity for "informed consent," there was a willingness to dilute and in some cases negate the intent of the policy. It will be demonstrated again during the discussion of the specific experiments that this attitude of selective compliance was more of the norm than the exception. Other evidence indicated that in 1956, prior to the approval to use human volunteers in testing of psychochemical drugs, research investigators at Edgewood Arsenal attempted to secure permission to employ a NIKE site crew as the small unit to be used in the type experiments recommended by the "Wolff Report."[24]

Another example of selective compliance with existing policy occurred in February 1956. A memorandum from the Deputy Chief Chemical Officer for Scientific Activities to the Commander of the Research and Development

Command recommended that the Chemical Corps scientific studies of LSD, a U.S. patented compound, be continued; that for military security reasons the owner of the patent not be advised of the present and possible future interest in the compound; and that a careful record of the quantities synthesized be maintained. This recommendation was made after a legal opinion was received from the Chemical Corps Patent Agency which, in effect, stated that use of the patent compound in the manner intended would be an infringement of the patent owner's rights and actionable by the patent owner; that based on this "the Chemical Corps may use the invention set forth in the reference patent and its only liability for so doing will be a requirement to pay a reasonable sum for so doing." It further opined that "governmental use of the invention need not be disclosed to assignee where such action would compromise security." [25] It is not known if the patent owner of LSD ever received notification of the use of his patent or reimbursement for such use. The point of this example is not simply to show possible violation of patent rights, but to again demonstrate the existence of a frame of mind and purpose which fostered a willingness to bend or break rules and policies so as to insure mission accomplishment; a continuing reliance on the "end justifies the means."

In March 1956 the staffing action on the September 1955 request for "Additional Use of Volunteers," which had apparently stopped pending receipt and review of the "Wolff Report," resumed when the Chief Chemical Officer forwarded the proposal to The Surgeon General, requesting his comments and concurrence. The forwarding indorsement pointed out that the Chemical Corps was conducting research investigations, using volunteers, in defense against chemical warfare, and that a small portion of such research, conducted entirely by highly qualified contractors, involved experimentation with psychochemical drugs. This research was reportedly authorized by the Secretary of the Army in his 5 November 1953 memorandum.[26] However, a review of the referenced memorandum does not indicate any reference to psychochemicals. To the contrary, the approved plan contained seven specific experiments involving nerve agents, oximes, and vesicants. Further, the Secretary of the Army directed that the same principles and safeguards which applied to the Department of the Army would apply equally to contracts awarded to outside contractors. The Chief Chemical Officer further stated that the increasing importance of the "minimum destruction" concept and the need for a defense against agents causing temporary incapacitation had led to the need for a concentrated study of psychochemical agents. Studies which, for the first time, would involve the use of psychochemicals on volunteers in the Chemical Corps laboratories. The proposed plan for testing psychochemicals provided the protocol, the name of the medical doctor in charge, and a proposal for the conduct of operational exercises to determine the vulnerability of military personnel to psychochemical agents in various military exercises. These exercises included: command post operations;

logistical exercises; squad drills; bridging operations; and fire direction center operations. Moreover, the request estimated that 200 volunteers would be required in the first year of experiments. This request was for a "class" of chemicals (psychochemicals) and for types of experiments rather than specific drugs for a specific experiment. This procedure, although not specifically prohibited by existing policy, appeared to be a departure from the intent of the policy, and as such did not provide those in the approval chain with a clear or complete picture of what actually was being proposed as it related to the volunteer. There was no evidence found indicating that objections or questions were raised concerning this lack of specificity. Although, on 11 April 1956 The Surgeon General, in his reply, did refer to earlier discussions and correspondence on the subject matter and that the proposal, as submitted, was a satisfactory development of ideas discussed, provided for adequate safeguards, and recommended approval by the Secretary of the Army.[27] However, no record of the earlier discussions or correspondence was located, nor was there other evidence discovered which would indicate that those higher in the chain of approval, to include the Secretary of the Army, received information other than that contained in the proposal and The Surgeon General's review. It was recognized that informal coordination or briefings could have provided more of the details as to the specific drug to be used. However, subsequent events do not reinforce this supposition. On 17 May 1956 the Director of Research and Development, in a memorandum to the Chief of Staff, U.S. Army, approved the plan as submitted, although there was a specific requirement that the Secretary of the Army must approve, in writing, each proposed use of human volunteers.[28] There was evidence that this deviation from policy was questioned immediately by responsible Chemical Corps personnel. However, a memorandum for record indicated that as a result of a discussion between a Chemical Corps legal advisor and an officer in the Director of Research and Development office, it was determined that the approval action was proper. There was no evidence found which would indicate that the Secretary of the Army approved the proposal, either in writing or orally; or that he delegated approval authority to the Director, Research and Development; or that he even had knowledge of the approval made in his stead. Several witnesses stated that since the Director of Research and Development was a member of the Secretary's staff, as the forerunner of the current Assistant Secretary of the Army for Research and Development, he would have been in the proper execution of his responsibilities when he approved the request in the name of the Secretary.[30]

Nevertheless, on 24 May 1956 the Medical Laboratory at Edgewood Arsenal was notified that the psychochemical testing plan had been approved. Since approval came through normal command channels, there would have been no reason for the Medical Laboratory Commander to question the authority to proceed with the planned experiments.[29] This request and subsequent approval appeared to have established two precedents:

(1) requests for the use of volunteers in drug testing could be approved on a "class" basis without specific mention of the wide variety of drugs involved, or their individual potential effects; and (2) regardless of earlier guidance, all protocols did not require the written approval of the Secretary of the Army. Undoubtedly, these two precedents laid the groundwork for future dilution of what had originally appeared to be clear and unequivocal centralized control of the authority to use volunteers.

## Army-Wide Recruitment

Available records indicate that by early 1957 inadequate numbers of volunteers were being made available to the Chemical Corps for conduct of human experiments. Thus, in April 1957 The Adjutant General of the Army directed the Army area commanders in the United States to establish a program to obtain volunteers for use at the Chemical Warfare Laboratories at Edgewood Arsenal.[31] This document cited the need for 50 volunteers per month and established a schedule for the six Army areas to furnish volunteers for 30-day TDY periods. The directive gave Chief of Staff Memorandum 385, dated 30 June 1953, as authority to conduct this program. It emphasized that voluntary consent of the human subject was absolutely essential; and stated that in all experiments involving volunteer subjects, the individual would be thoroughly informed of all procedures and what to expect during each test. Furthermore, the volunteer would be free to determine whether or not he desired to participate.

On 11 July 1957 the Chief Chemical Officer wrote a letter addressed to all Chemical Officers in the Zone of Interior (ZI), in which he encouraged them to energetically support the volunteer program, emphasizing the importance of the volunteer's contribution to the national defense effort.[32]

## Air Force-Navy Participation

During the same timeframe, the United States Air Force and the Department of the Navy were invited to participate in the volunteer program by sending 10 men each month. Records reflected that the Air Force contributed volunteers starting in November 1957; the Navy apparently elected not to join the program at this time.[3] Available records reflected that between May 1955 and December 1957 approximately 540 volunteers were employed in the program at Edgewood Arsenal; 14 of these were reported to have been from the Air Force.[3] However, indications were that this figure did not include the assigned technical assistants and researchers who "informally" volunteered. However, records indicated an additional project involving Air Force and Army participation in August 1961 when the Chemical Research and Development Command submitted a protocol for "experimental exposures of men to propellant vapors." This experiment was reported as an Air Force research project conducted with the use of Air Force volunteers.[47] Although there was evidence that the protocol was submitted through U.S. Army Chemical Corps channels for the purpose of receiving Secretary of the Army's approval, there were no records discovered which indicated that such approval was granted. It is possible that approval was granted and records not retained in historical files. However, the important point is not the absence of records, but that responsible investigators and commanders recognized that this type of research test was not included within the broad authority previously received.

## V-Agent Studies

Further interpretation of which experiments actually required personal approval by the Secretary of the Army was found in the documentation concerning approval to conduct volunteer tests with V-agents (lethal nerve agents). In May 1958 the Commander, Chemical Warfare Laboratories, submitted a request, subject: "Use of Volunteers in Research on V-Agents," through Chemical Corps Command channels, requesting authority to test V-agents in man. Specified in the proposal was the statement that one of the proposals, submitted and subsequently approved by the Secretary of the Army in November 1953, included the use of G-agents (nerve agents), which are highly toxic organo-phosphorus compounds. The request continued that even more effective organo-phosphorus compounds, known as V-agents, had been synthesized.[33] The Chief Chemical Officer, in forwarding the request to The Surgeon General for his comments and/or concurrence, stated that research investigations being conducted under the 5 November 1953 approval involved G-agents and implied that the request to use V-agents was simply a logical extension of the initial plan. In June 1958 the Chief, Research and Development Division, Office of The Surgeon General, responded to the May 1958 request by pointing out that a critical review could not be made on the basis of information provided in the proposal, however, it did state that the proposal, as written, satisfied the minimum requirements under Chief of Staff Memorandum 385. The Surgeon General commented that since human studies on V-agents were a logical extension of the nerve gas studies previously approved by the Secretary of the Army, that the same responsible medical doctor was in charge, and the investigation would adhere to the provisions of Chief of Staff Memorandum 385, then it was believed that no new authorization was required.[34] The requested comments were returned to the Chief Chemical Officer, and ultimately the research project involving the use of V-agents in human volunteers began.

In reviewing The Surgeon General's comments in this instance, it was noted that there was reference to more stringent safeguards used in the volunteer program with BW agents. These included: submission of a protocol for each new series or phase of study; a critical review by The Surgeon General to insure compliance with Chief of Staff Memorandum 385 before proceeding; and continual review of experimental results. This indication of the use of a double standard in implementing policy on use of volunteers was not further explained.

The Surgeon General's comments point out this difference very succinctly and ultimately agreed with the original contention that it was a logical extension of G-agent research, requiring no further authorization. Documentation was not found which would explain how after a proposal to employ a more highly toxic agent on humans was received, and the reviewing official in The Surgeon General's office concluded initially that a review or constructive comments could not be made on the basis of the information provided, and still be adequate to satisfy the minimum requirements of the Chief of Staff Memorandum 385 policy. In spite of these unanswered critical questions, the reviewer, in effect, agreed with the proposal and added weight to the interpretation of policy made by the Chemical Corps.

## Policy Interpretations

Meanwhile, in the fall of 1957 the U.S. Army Chemical Research and Development Command had directed the term K-agent be used instead of psychochemical agent. Although these terms continued to be used interchangeably, it was noted that at this point in time the Medical Laboratory at Edgewood Arsenal had approval to use volunteers in experiments involving three classes of compounds: G-agents; V-agents; and K-agents. However, the Secretary of the Army actually had signed only the authorization for seven investigative studies using nerve agents (G-agents). At this point it appeared that the deviance from the established policy could be attributed to a failure of staff officers at Department of the Army level to comply with the letter and the intent of policy established by the Secretary of Defense and expanded on by the Secretary of the Army.

In early November 1958 the Medical Laboratory at Edgewood submitted, through Chemical Corps channels, a request to use female volunteers in conjunction with the psychochemical research program. The request was then forwarded to The Surgeon General for comment, who recommended that the request be disapproved on the basis that the early stage of research in the area of psychochemical research and the serious legal and public relations implications involved in the use of female volunteers made it inadvisable to use females at this time.[35] Apparently, the Chief Chemical Officer agreed since that was the basis cited in his disapproval of the request. Subsequently, the Deputy Commander of the Chemical Warfare Laboratory, in an internal memorandum to the laboratory director stated that females could not be used on the basis that their use was strictly prohibited by the provisions of Chief of Staff Memorandum 385.[36] At this time we find one request, use of female volunteers, but two different reasons why they could not be used; one of which involved an interpretation of Chief of Staff Memorandum 385.

Thus, it appears that each request which involved application of the provisions of Chief of Staff Memorandum 385 resulted in an interpretation of the policy. More startling was the lack of consistency in the interpretations, ranging from the most strict to the widest possible latitude.

Another example of the highly flexible interpretations of policy occurred in November 1958, when the Chemical Warfare Laboratory Commander submitted a request to have an additional physician authorized to accept direct responsibility for the conduct of experimentations on human volunteers during the absence of the primary doctor. This doctor was to be in addition to the responsible physician required to be appointed by the Secretary of the Army in accordance with DOD policy. The Surgeon General recommended that another doctor be authorized to accept direct responsibility in the absence of the responsible physician and included an additional control to be used if the request was approved. However, the Chief, Research and Development, disapproved the req est and stated that: "as interpreted in all actions to date, the provisions of Chief of Staff Memorandum 385 do not permit the dilution of personal responsibility in the prosecution of the human volunteer program." Included with this disapproval was a copy of an opinion by The Judge Advocate General (TJAG) in which it was opined that there was no legal requirement that anyone be designated to assume direct responsibility when the designated doctor was absent.[37] To the contrary, the policy clearly contemplated one person should be so designated and would retain responsibility at all times. However, it also contemplated that other qualified persons would be placed in charge of specific experiments, subject to direction and control of the designated doctor. Again, we have an example of inconsistent interpretation.

Finally, in June 1969 a proposal titled, "Physiological Stress Aspects of Chemical Agents," was submitted by the Director of the Biomedical Laboratory at Edgewood Arsenal.[66] The proposal clearly indicated the intent to use safe amounts of chemical agents in human volunteers in connection with selected physiological stress experiments. However, it did not specify which chemical agents were to be used. The Office of The Surgeon General reviewed the protocol in the light that chemical agents would be used, although the protocol stated that a separate request for approval of actual chemical agents would be submitted.[67] The Office of the Chief of Research and Development approved the request and ruled that since chemical agents were not included in the protocol, Secretary of the Army approval was not required under AR 70-25.[68]

On 12 September 1969 the Office of The Surgeon General returned the approved request to Edgewood Arsenal.[69] Although it is known that experiments under this protocol were conducted at Edgewood, no evidence was found of the Secretary of the Army's approval of the specific chemical agents used. The submission of this particular protocol without mention of the chemical agents to be employed seemed to have negated the purpose of retaining authority at any level above the laboratory. The Army regulation in force at that time (AR 70-25) required the "detailed plan" to be submitted to The Surgeon General. The plan could hardly be considered a "detailed plan of experiment" without inclusion of the chemical agents intended to be used on the volunteers. It is conceivable that with approval of the protocol, less the chemical agents, the investigators could employ chemical agents previously approved in connection with the new plan.

Even though there were significant advances and changes in the research and the volunteer programs between 1953 and 1958, there was no indication of corresponding changes or updating of the policy directives.

By December 1958 there appeared to be concern about which chemical compounds were approved for use in volunteer subjects. Evidence of this concern was found in correspondence between the Director of the Medical Research Laboratories (Edgewood Arsenal) to the Commander, Chemical Warfare Laboratories (Edgewood Arsenal), and the Commanding General, Chemical Research and Development Command (Washington, DC), during the month of December 1958.[38] The gist of these documents was that the Medical Laboratories had initiated or intended to initiate research programs using volunteers to test chemical agent EA 1779 (CS), a riot control agent that causes extreme irritation to mucous membranes, and agent EA 1476 (tetrahydrocannabinols, a marihuana like compound). This was in addition to approvals already received for experiments with G-, V-, and K-agents. The documents indicated that the Chemical Research and Development Command agreed that research approval had been granted for G-agents (GA and GB), V-agent (VX), and K-agent (LSD-25); however, the Medical Laboratory was directed to suspend EA 1476 volunteer studies until Secretary of the Army approval was granted.[39] Available records indicated that the protocol for EA 1476 had not been submitted as of the end of December 1958, although there was an inference that some volunteer studies had been conducted. Additionally, the Medical Laboratory was permitted to continue volunteer studies with EA 1779 (CS), provided the protocol was submitted to their next higher command (Chemical Warfare Laboratory) by 30 December 1958.[40] The records indicated that the protocol for EA 1779 was submitted to the Commander, U.S. Army Chemical Research and Development Command, on 30 December 1958.[41] This series of documents indicated that the various Chemical Commands were in substantial agreement in regard to which protocols by class and agent were authorized for use in volunteer studies. The documents also indicated other areas of concern, to include: the desire to be in full compliance with Chief of Staff Memorandum 385 (CS:385) as evidenced by the suspension of the EA 1476 (marihuana) experiments; and the desire to avoid delays in the program while pending submission of the necessary protocol as evidenced by the granting of interim permission to continue EA 1779 (CS) studies while awaiting formal approval.

In February 1959 the Commander, Chemical Warfare Laboratories, reportedly learned that a woman had been exposed to EA 1779 (CS) in a planned experiment at the Medical Research Laboratory at Edgewood.[36] As a result of this incident, the Chemical Warfare Laboratories Commander sent his laboratory commanders a memorandum in which he stated that the use of females in human volunteer research programs was not authorized. Additionally, he emphasized that there were three definite control measures governing any particular experiment: the basic policy document on the use of human volunteers (Chief of Staff Memorandum 385); the specific protocol that was developed for use of a particular agent; and the detailed plan for the actual exposure of human volunteers which required approval by the individual designated by the Department of the Army as responsible for the use of chemical warfare agents on human volunteers.[36]

Following the 30 December 1958 submission of the protocol for EA 1779, no evidence was discovered which indicated actual Secretary of the Army approval for use of this agent. However, in July 1959 EA 1779 did appear on a list of agents approved to be used on humans which was published by the Chemical Warfare Laboratories. Also in July 1959, a directive from the Commander, Chemical Warfare Laboratories, Edgewood Arsenal, established that no individual could use on himself any agent for which an approved protocol was not available; another indication of tightening of controls.

In July 1959 the protocol for research involving chemical agent EA 1476 (marihuana) and related compounds and for phencyclidene (sernyl) benzilates and related compounds was submitted through Chemical Command channels. One of the accompanying documents included a declaration that prior to learning of the interpretation that each class of chemical agents necessitated separate approval from the Secretary of the Army for volunteer testing, chemical agent EA 1476 had been tested in about 36 volunteers.[44] There was no indication of who decided that each class of chemical agent had to be approved separately, or who decided on "class" approval as opposed to individual agent approval, which appeared to be the intent of the original directive from the Secretary of Defense ("Wilson Memorandum"). Although the initial request of 17 July 1959 was for two different classes of compounds (tetrahydrocannabinols and benzilates), the only protocol found for the period of time was the former. Moreover, the request from the Chief Chemical Officer to The Surgeon General for comments and/or concurrence addressed only EA 1476 and related compounds. On 21 July 1959 the protocol was concurred in by The Surgeon General. It is assumed that the protocol was then processed through normal command channels, although no documentation was found which indicated such staffing prior to the Secretary of the Army action in October 1959. On 8 October 1959 Secretary of the Army Wilber M. Brucker forwarded a memorandum to the Chief of Staff, U.S. Army, which stated: "approval is granted for the conduct of research investigations using volunteers for studies in defense against nonlethal incapacitating chemical warfare agents. These experiments will conform to the proposed plans submitted by the Chief Chemical Officer and reviewed by The Surgeon General, U.S. Army (Inclosure 1)." The memorandum further provided: "additional authority is granted to pursue similar volunteer studies with other nonlethal incapacitating chemical warfare agents provided The Surgeon General, U.S. Army, concurs with the protocol and procedures proposed by the Chief Chemical Officer, U.S. Army."[45] Clearly, Secretary Brucker delegated approval authority to two special staff members of the Department of the Army (Chief Chemical Officer and The Surgeon General) as regarded future "nonlethal incapacitating chemical warfare agents." It was not evident how often and to what degree that delegation was used. The nonavailability of documents in this regard may be attributed to the dilution of a formal approval procedure. Secretary Brucker's action did not require a signature approval "by either the Chemical Officer or The Surgeon General," nor was there any evidence that he required a copy of an approved plan to be provided either to his office, the Office of the Army Chief of Staff, Director of Research and Development, or the Secretary of Defense as required by the "Wilson Memorandum." It was possible that future approvals were informally coordinated with The Surgeon General and verbally approved by the Office of the Chief Chemical Officer. This possibility was supported, as mentioned earlier in this report, in that during the late 1950s and early 1960s interest and research in nonlethal incapacitating chemical warfare agents was very intense.

Secretary Brucker's approval was transmitted from the Chief, Research and Development, to the Chief Chemical Officer and The Surgeon General on 13 October 1959 without further guidance. On 16 October 1959 the Office of the Chief Chemical Officer relayed the approval to the Commanding General, Chemical Corps Research and Development (R&D) Command, again without adding amplification or clarification. The Chemical R&D Command forwarded it to the Chemical Warfare Laboratories on 23 October 1959 with a caution that experiments must conform to the proposal already approved for EA 2148 and EA 1476 (marihuana compounds) and related compounds and benzilates and related compounds. On 17 November 1959 the approval reached the Director, Medical Research Laboratory, Edgewood Arsenal, and directed that volunteer studies would be limited to EA 2148 and homologs, EA 1476 and homologs, LSD-25, CS, and benzilates.[46] It was of interest that the 17 November 1959 document did not include the term "related compounds"; this could have been an oversight or an effort to limit the latitude permitted the laboratory investigators. Taken literally, the omission of "related compounds" after benzilates would preclude experimentation, without additional approval, of candidate agents other than benzilates in the glycolate class. The original approval of benzilates and "related compounds" apparently would have permitted experiments with any glycolate agent. However, the evidence does not clearly indicate that this was an intentional restriction, or that it was perceived as a restriction by the research investigators.

It was also not surprising that there was a lack of evidence of new chemical agent protocols being submitted during this period. As far as the medical research investigators were concerned, approval was at hand to use volunteers in research involving the following: G-agents (nerve); V-agents (nerve); K-agents (psychochemicals); CS (irritants); tetrahydrocannabinols (marihuana); and benzilates (which could be interpreted to include other glycolates).

## Benzilate Research

As was discussed earlier, the search for incapacitating agents intensified when the Kennedy administration took office. Specifically, Department of Defense "Project 112" placed a high priority on development of a chemical incapacitating agent. Records indicated that by 1962 the primary agent to meet this requirement was a benzilate called agent "BZ" or "EA 2277." Plans for this agent apparently called for development of munitions, stockpiles, and storage facilities, as well as essential research. By April 1962 the program had progressed to the point that on 23 April 1963 the Assistant Secretary of the Army (Research and Development) appointed a project officer to provide overall supervision of the project. On 20 June 1962 the Secretary of the Army signed a memorandum to the Secretary of Defense notifying him that the Army had already initiated action to have the doctrine for employment, storage, and handling of agent "BZ" completed prior to delivery of the munitions.[61] It apparently was assumed that formal Secretary of the Army approval for the agent research was included in Secretary Brucker's 8 October 1959 approval for use of volunteers in tests of "Phencyclidene ('Sernyl'), benzilates and related compounds."[45]

In March of 1972 the Director of the Biomedical Laboratory at Edgewood Arsenal submitted a proposed protocol for the "glycolate agents."[70] The request stated that Secretary of the Army approval had been obtained in earlier years, but that the Office of The Surgeon General and Office of the Chief, Research and Development, had suggested resubmission. No evidence was found which confirmed that either of the proposals were approved by the Secretary of the Army. However, it is possible that reference to earlier approval by the Secretary of the Army related to Secretary Brucker's approval of "benzilates and related compounds" in October 1959.[45]

## Regulatory Controls

On 26 March 1962 the first Army regulation governing the "Use of Volunteers as Subjects of Research" was published (AR 70-25).[48] The purpose of the regulation was to "prescribe policies and procedures governing the use of volunteers as subjects in Department of the Army research, including research in nuclear, biological, and chemical warfare, wherein human beings are deliberately exposed to unusual or potentially hazardous conditions. These regulations are applicable worldwide, wherever volunteers are used as subjects in Department of the Army research." This regulation did not indicate supersedure of any previous directive(s), however, it appeared to be intended for that purpose. It provided for certain exceptions to policy for those performing normal hazardous duties, such as flight and jump training, fire and gas drills, and the like, similar to those discussed during the early Chemical Corps Advisory Council meetings. It listed basic principles to be observed by investigators, which were nearly identical to those recommended to the Secretary of Defense by the Armed Forces Medical Policy Board in early 1953. The regulation provided that: "a physician approved by The Surgeon General will be responsible for the medical care of volunteers. The physician may or may not be the project leader, but will have authority to terminate the experiment at any time that he believes death, injury, or bodily harm is likely to result." This provision appeared to be a change in the interpretation of guidance provided by the "Wilson Memorandum," which apparently intended that the service secretary would approve, in writing, the physician in charge, as well as the protocol for the experiment.

Appointment of Responsible Physician

A brief discussion of the history of the appointment of "responsible physicians" for the medical volunteer program is in order at this point.

Evidence indicated that in April 1956 the Secretary of the Army approved the appointment of Dr. Van M. Sim as physician responsible for volunteers in chemical warfare research.[49] The records further indicated that in November 1958 an effort was made to expand the "one physician in charge" requirement (as mentioned earlier in this chapter), when the Chief Chemical Officer requested the Secretary of the Army to appoint Dr. Kimura, assigned to the Medical Research Laboratory, as the alternate physician in charge, to act as such when Dr. Van M. Sim was temporarily absent from the laboratory. However, the request was not approved[50] and the requirement for a responsible physician remained unchanged.

Authority to appoint the physician in charge had remained with the Secretary of the Army. This was indicated on 18 June 1959 when the Under Secretary of the Army, acting for the Secretary, appointed Colonel Lindsey, newly assigned Director of the Medical Laboratory, to replace Dr. Van M. Sim as the responsible physician.[51] This level of authority apparently continued until 17 July 1962 (after publication of AR 70-25) when a request to have Colonel Lindsey's replacement as director (Colonel Bauer) appointed as responsible physician was forwarded to the Office of the Chief Chemical Officer, who forwarded the request through The Surgeon General to the Chief, Research and Development. On 6 August 1962 The Surgeon General recommended approval and on 17 August 1962 the Chief, Research and Development, approved the designation of Colonel Bauer.[52] Although the regulation (AR 70-25) provided for The Surgeon General to approve the responsible physician, in this instance the appointment was made by the Chief, Research and Development. On 20 March 1963 the Commander, Chemical Research and Development Laboratory, submitted a request to have Dr. Van M. Sim appointed responsible physician to replace Colonel Bauer. The request was forwarded through the U.S. Army Munitions Command and U.S. Army Materiel Command to The Surgeon General, who, on 16 April 1963, recommended to the Chief, Research and Development, that Dr. Sim be appointed on an interim basis until a Medical Corps officer was assigned as Director of the Laboratory. On 18 April 1963 the Chief, Research and Development, approved The Surgeon General's recommendation and further requested that the Commander, U.S. Army Materiel Command, upon the assignment of a Medical Corps officer as Director of Medical Research, take necessary action to designate him as the responsible physician.[53] Several months later, on 26 September 1963, Colonel Blair was appointed to replace Dr. Sim, a position he held for eleven years.[54] Although it could not be determined at what level of authority this appointment was made, correspondence directed to the Commander, U.S. Munitions Command, was obtained and it is assumed that the Commander, U.S. Army Materiel Command, approved the designation. By 1974 the practice of service secretary approval of the "Medical Officer Responsible for Volunteers" had come full cycle. On 9 September 1974 Colonel McClure, Director, Biomedical Laboratory, was appointed by the Secretary of the Army, even though the governing regulation (AR 70-25, dated 31 July 1974) required, as did the earlier version, that The Surgeon General approve the appointment of the physician responsible for the medical care of volunteers.[73]

Although the level of approval authority for appointment of the physician responsible for volunteers in research apparently was changed, the authority to approve a specific protocol was retained by the Secretary. Paragraph 6, AR 70-25, dated 26 March 1962, Approval to Conduct Experiments, provided that: "It is the responsibility of the head of each major command and other agency to submit to The Surgeon General a written proposal for studies which come within the purview of this directive. The proposal will include for each study the name of the person to be in charge, name of the proposed attending physician, and the detailed plan of the experiment. The Surgeon General will review the proposal and forward it with his comments and recommendations on medical aspects to the Chief of Research and Development for approval. When a proposal pertains to research with nuclear, biological or chemical agents, the Chief of Research and Development will submit the proposal, together with The Surgeon General's review, to the Secretary of the Army for approval. No research with nuclear, biological or chemical agents using volunteers will be undertaken without the consent of the Secretary of the Army."[48] AR 70-25 was revised in July 1974. The revision transferred the final approval authority from the Chief of Research and Development to The Surgeon General for all research using volunteers, except research involving nuclear and chemical warfare agents. Approval for nuclear and chemical warfare agents was retained by the Secretary of the Army.

## Medical Corps/Chemical Corps Agreements

The procedures for gaining approval of the use of human volunteers in chemical warfare agent experiments apparently was well defined, to include mandatory review and comment by The Surgeon General. In effect, once The Surgeon General had reviewed a protocol, his role in that phase of chemical agent research was finished, unless specific requests for assistance or advice were received. Thus, the medical expertise available from the Office of The Surgeon General apperently was absent during the actual conduct of experiments. A means to alleviate this problem may have been available through the initiation of a series of Joint Medical-Chemical Agreements.

The first known agreement was dated August 1958 and was titled: "The Joint Medical-Chemical Agreement to Conduct Research and Development." This agreement, which was signed by The Surgeon General and the Chief Chemical Officer, provided that The Surgeon General would assign a medical doctor as Director of the Medical Research Laboratory (Biomedical Laboratory) who would have his performance rated by the Commanding Officer of the Chemical Warfare Laboratories at Edgewood Arsenal. The Director's performance would be indorsed by the Commanding General, Army Medical Research and Development Command. Thus, the Director would work primarily for the Chemical Corps and have the initial part of his performance report completed by his Chemical Corps superior; and secondarily he would serve as the chemical warfare advisor to the Commanding General, Army Medical Research and Development Command (which was directly under The Surgeon General), who would be the indorsing officer for the duty performance report.[56] The agreement appeared to be an adequate method for insuring that The Surgeon General's office was kept informed of the Medical Research Laboratory's efforts. The agreement was renewed in March 1959 with the appointment of a new Chief Chemical Officer[57] and again in January 1963, when the Chemical Corps' responsibilities were transferred to the Army Materiel Command.[58] Another reference to this agreement was found in an August 1972 version, which was amended in November 1972, to allow for: annual program planning and evaluation to be made jointly between The Surgeon General and the Commanding General, U.S. Army Materiel Command; performance evaluation of the Biomedical Laboratory director to be made by Edgewood Arsenal Technical Director and indorsed by the Commander, Medical Research and Development Command; and for the submission of research protocols to U.S. Army Materiel Command for new classes of chemical agents not previously approved. These protocols were to be reviewed by The Surgeon General and forwarded to the Secretary of the Army for approval.[59]

## Other Regulatory Controls

In 1964 two separate Department of Defense Instructions were published which seemed to separate chemical and biological research from investigational drugs research. The first, Department of Defense Instruction

Number 5160.5, dated 7 February 1964, subject: Responsibilities for Research, Development, Test and Evaluation on Chemical and Biological Weapons and Defense,[62] directed that each service would be responsible for preparation and conduct of its own programs and that the Army would be responsible for joint requirements. The second publication was Department of Defense Instruction Number 5030.29, dated 12 May 1964, subject: Investigational Use of Drugs by DOD. It stated that: "DOD assumes full responsibility for the protection of humans involved in research under its sponsorship, whether this involves investigational drugs or other hazards." To monitor this responsibility, DOD directed that each military department establish, within the office of its respective surgeon general, a formal board of professional personnel to consider each research proposal from within that military department or from its contractors, or grantees, which may involve the use of human subjects in clinical investigation of new drugs. (To implement this, the Army established the Army Investigational Drug Review Board.) Furthermore, the DOD instruction provided that before a clinical test with an investigational drug was performed under the sponsorship of a military department, the plan of the test and other pertinent details would be submitted to the appropriate review board. The board, in turn, would indicate its approval and forward the plan with its approval to the service surgeon general for confirmation. DOD further directed that each service would prepare a plan to implement the requirements discussed above within 60 days. Attached to the DOD instruction was a memorandum of understanding between the Department of Health, Education and Welfare and DOD concerning: "Investigational Use of Drugs by the DOD."[63]

Although both of the DOD instructions were signed by the Director of Defense Research and Engineering, they did not make reference to each other or mention a possible relationship. Nevertheless, the Army apparently perceived the requirements as separate and distinct. As an example, it appeared that between 1964 and 1974 a basic drug such as LSD could be processed through two different channels, depending on its proposed use. If the investigator was within the Medical Research and Development family, the protocol would go before the Army Investigational Drug Review Board (AIDRB) and receive final approval from The Surgeon General, if warranted (AR 40-7). On the other hand, the protocol from investigators employed at the Biomedical Laboratory at Edgewood Arsenal would be routed through the Army Materiel Command channels to The Surgeon General for concurrence on the medical aspects of the protocol (AR 70-25) and final approval was to come from the Secretary of the Army after receiving The Surgeon General's comments. AR 70-25 did not, and still does not, require the drug (LSD in this case) to be reviewed by the Drug Review Board as part of The Surgeon General's procedure. To compound the problem, those drugs which were already being investigated on human subjects as investigational drugs were not required by regulation to be submittedfor review after the AIDRB was established. Thus, two different systems existed to seek approval for the same drug. Neither system, chemical or medical, apparently provided for retroactive application to ongoing agent or drug research previously approved.

Finally, in November 1964 the Department of the Army published AR 40-7 (13 November 1964), subject: Clinical Use of Investigational Drugs.[64] This regulation superseded AR 40-2, dated 14 November 1960, and directed that new drugs required for investigational use would not be used without prior approval of The Surgeon General. AR 40-7 also provided for extensive review of the proposed protocol by the AIDRB. This regulation subsequently was revised and republished on 21 July 1967, 30 September 1969, and 4 April 1975, without major modification or change.[65]

On 10 September 1975 LTG Richard R. Taylor, The Surgeon General of the Army, testified before Congress that: "in October 1974, The Surgeon General established the Human Use Review Office under the direction of the Assistant Surgeon General for Research and Development. The Human Use Review Office was charged with administering and coordinating activities of the Army Investigational Drug Review Board, the U.S. Army Medical Research and Development Command Contract Review Board and The Surgeon General's Human Use Committee and Clinical Investigation Committee, to insure uniform application of ethical standards for human research studies conducted within or sponsored by the Army Medical Department and other Army Agencies. The Human Use Review Committee is the central Army processing point for all extramural and intramural human subject research which require approval under provisions of Army Regulations." While discussing Defense Against Chemical Weapons, Lieutenant General Taylor reported: "Furthermore, the review mechanisms applied to Edgewood have been tightened over the last two years so that protocols are reviewed by the Army Investigational Drug Review Board and Human Subjects Research Review Board and relevant Department of Defense and Food and Drug Administration regulations are followed."[72]

## Suspension of Human Volunteer Program

On 28 July 1975 Acting Secretary of the Army Norman R. Augustine suspended testing of chemical compounds on human volunteers at Edgewood Arsenal.

## FOOTNOTES

## CHAPTER IV

1. General Order No. 62, dated 28 June 1918, by The War Department.

2. Chemical Warfare Service, Edgewood Arsenal, General Order No. 15, dated 12 October 1922.

3. Chemical Research and Development Laboratory Special Publication 2-51, Evaluation of Medical Research Volunteer Program, published in 1962.

4. Chemical Corps Advisory Council, Medical and Related Problems Committee Meeting Minutes of 20-21 March 1953.

5. Office, Chief Chemical Warfare Service Officer, Order No. 48, dated 3 July 1943.

6. Text of Testimony of Lieutenant General Taylor, The Surgeon General, Department of the Army, to U.S. Senate, 94th Congress, 1st Session.

7. Section 104 of the Act of 10 July 1950 (74 Statute 322; 5 USC, 235a).

8. Armed Forces Medical Policy Council Papers, Fall 1952.

9. Secretary of Defense Memorandum for Secretary of the Army, Navy, and Air Force, subject: Use of Human Volunteers in Experimental Research, dated 26 February 1953. "Wilson Memorandum."

10. Secretary of the Army Memorandum for Chief of Staff, Army, subject: Use of Human Volunteers in Experimental Research, dated 20 May 1953.

11. Chief of Staff Memorandum through Assistant Chief of Staff, G-4, for Chief Chemical Officer and The Surgeon General, subject: Use of Volunteers in Research, dated 30 June 1953 (CS:385).

12. Commanding General, Chemical Research and Engineering Command, Letter, subject: Use of Volunteers in Research, dated 24 July 1953.

13. 1st Indorsement to 12, above, dated 7 August 1953.

14. Secretary of the Army Memorandum for Chief of Staff, Army, subject: Use of Volunteers in Research, dated 5 November 1953.

15. Chief Chemical Officer Letter, subject: Use of Volunteers in Research, to Commanding General, Chemical Corps Research and Engineering Command, dated 24 December 1953.

16. Secretary of the General Staff Memorandum, subject: Use of Volunteers in Research, dated 16 October 1953.

17. Summary of Major Events and Problems for FY 54.

18. Headquarters, 2d Army, Letter, subject: Recruitment of Human Volunteers, to Class I and II Installation Commanders, dated 11 April 1955.

19. Medical Research Laboratories Disposition Form prepared by the Clinical Research Division, dated 8 March 1956.

20. Medical Research Laboratories Letter, subject: Additional Use of Volunteers in Research, to Commanding General, Chemical Research and Engineering Command, dated 7 September 1955.

21. Chemical Corps Research and Development Command Letter to Chief Chemical Officer, Department of the Army, subject: Additional Use of Volunteers in CW Research, dated 22 March 1956.

22. Report of The Ad Hoc Study Group on Psychochemical Agents, published 19 November 1955.

23. Medical Research Laboratories Disposition Form, subject: PBC 206/1 (Reference Wolff Report), dated 16 January 1956.

24. Chemical Corps Research and Development Command Letter to Dr. Wolff, dated January 1957.

25. Deputy Chief Chemical Officer for Scientific Activities Memorandum, subject: LSD Patent Rights, to Commander, Chemical Research and Development Command, dated 3 February 1956.

26. Chief Chemical Officer Letter to The Surgeon General, subject: Additional Use of Volunteers in CW Research, dated April 1956.

27. The Surgeon General Letter to Chief Chemical Officer, subject as 26, above, dated 11 April 1956.

28. Director of Research and Development Memorandum for Chief of Staff of the Army, subject as 26, above, dated 17 May 1956.

29. Chemical Research and Development Command Letter to Chemical Warfare Laboratories, subject as 26, above, dated 24 May 1956, with Memorandum for Record by Dr. Sporn.

30. Informal conversations with Colonel Vogal (Retired), Dr. Sporn, Dr. K. C. Emerson, Colonel Steed (Retired).

31. The Adjutant General of the Army Letter, subject: Use of Volunteers in Research, to Commanding Generals of Zone of Interior (ZI) Armies, dated 18 April 1957.

32. Chief Chemical Officer Letter to All Chemical Officers, subject: Medical Research Volunteer Program, dated 11 July 1957.

33. Chemical Research and Development Command Letter, subject: Additional Use of Volunteers in Research, to Chief Chemical Officer, dated 20 May 1958.

34. The Surgeon General Letter, subject: Additional Use of Volunteers in Chemical Warfare Research, to Chief Chemical Officer, dated 12 June 1958.

35. Chief Chemical Officer Letter, subject: Use of Female Volunteers, to The Surgeon General, dated 14 November 1958 (forwarding request from Chemical R&D Command, dated 4 November 1958).

36. Chemical Warfare Laboratories Internal Letter, subject: Use of Volunteers for Agent EA 1779 Tests, dated 10 February 1959.

37. Medical Research Laboratories Letter, subject: Appointment of Additional Responsible Physician, to Chief Chemical Officer, dated 4 November 1958.

38. Chemical Corps R&D Command Letter to Commander, Chemical Warfare Laboratories, subject: Use of Volunteers, dated 8 December 1958.

39. Chemical Corps R&D Command Letter to Commander, Chemical Warfare Laboratories, subject: Use of Volunteers, dated 15 December 1958.

40. Chemical Warfare Laboratories Letter to Director of Medical Research, subject: Use of CW Agents on Volunteers, dated 23 December 1958.

41. Chemical Warfare Laboratories Letter to Army Chemical R&D Command, subject: Use of Volunteers in Testing EA 1779 (CS), dated 30 December 1958.

42. Chemical Warfare Laboratories Letter, 27 July 1959, regarding approved agents to be used on humans.

43. Summary Sheet, Chief Chemical Officer to Chemical Corps R&D Command, proposed volunteer studies of EA 1476 and related compounds, dated 30 July 1959.

44. Chemical Corps R&D Command Letter to Chief Chemical Officer, subject: Proposed Volunteer Studies of EA 1476, dated 17 July 1959.

45. Secretary of the Army Memorandum for Chief of Staff, subject: Use of Volunteers in Research, dated 8 October 1959.

46. Chemical Corps R&D Command Letter to Commander, Chemical Warfare Laboratories, dated 23 October 1959; Letter from Chemical Warfare Laboratories to Director, Medical Research Laboratory, dated 17 November 1959, subject: Use of Volunteers in Research.

47. Chemical Corps R&D Laboratories Letter to Commanding General, Chemical Command, subject: Experimental Exposures of Men to Propellant Vapors, dated 2 August 1961.

48. Army Regulation 70-25, dated 26 March 1962, R&D Use of Volunteers as Subjects of Research.

49. Chief of Research and Development Memorandum to Chief Chemical Officer, subject: Appointment of Physician in Charge of Volunteers, dated 20 April 1956.

50. The Judge Advocate General Memorandum regarding physical presence of physician in charge, dated 17 November 1958.

51. Chief Chemical Officer request of 17 April 1959, Medical Officer Responsible for Volunteers. 18 June 1959 approval by Under Secretary, Army.

52. Chemical R&D Letter to Commanding General, Chemical R&D Command, subject: Medical Officer Responsible for Volunteers, dated 17 July 1962.

53. Chemical R&D Letter to Commanding General, R&D Command, subject as 52, above, dated 20 March 1963.

54. Army Materiel Command Letter of Appointment, Medical Officer Responsible for Volunteers, dated 26 September 1963.

55. Army Regulation 70-25, Research and Development Use of Volunteers as Subjects of Research, dated 31 July 1974.

56. Joint Medical-Chemical agreement to conduct Research and Development, signed by Major Generals Hays and Creasy in August 1958.

57. Joint Medical-Chemical agreement to conduct Research and Development, signed by Major Generals Hays and Stubbs in March 1959.

58. Joint Army Medical Service-Army Materiel Command agreement on Responsibilities for the Conduct of R&D Defense Against CG Agents, signed by General Besson and Lieutenant General Heaton on 23 January 1963.

59. Memorandum of Agreement, Army Materiel Command-The Surgeon General, of August 1972.

60. Summary Sheet, subject: Project Manager for Agent EA 2277, dated 18 April 1962.

61. Secretary of the Army Memorandum to Secretary of Defense, subject: Use of Chemical Agent BZ, dated 20 June 1962.

62. Department of Defense Instruction Number 5160.5, subject: Responsibilities for Research and Development, Test and Evaluation on Chemical and Biological Weapons and Defense, dated 7 February 1964.

63. Department of Defense Instruction Number 5030.29, subject: Investigational Use of Drugs by DOD, dated 12 May 1964.

64. Army Regulation 40-7, Clinical Use of Investigational Drugs, dated 13 November 1964.

65. Army Regulation 40-7, Clinical Use of Investigational Drugs, dated 21 July 1967; superseded on 30 September 1969 and 4 April 1975.

66. Edgewood Arsenal Letter to The Surgeon General, subject: Physiological Stress Aspects of Chemical Agents, dated 19 June 1969.

67. 26 August 1969 The Surgeon General Indorsement to Chief, Research and Development, Department of the Army.

68. 3 September 1969 Chief, Research and Development, Indorsement to The Surgeon General.

69. 12 September 1969 The Surgeon General Indorsement to Edgewood Arsenal.

70. Biomedical Laboratory Letter to The Surgeon General, subject: Plan for Glycolate Agents, dated 6 March 1972.

71. News Release from Office, Chief of Information, Department of the Army, dated 28 July 1975.

72. Prepared statement by Lieutenant General Taylor, The Surgeon General, Department of the Army, before the Subcommittee on Administrative Practice and Procedure of the Judiciary Committee, 10 September 1975.

73. Secretary of the Army Memorandum for Commander, U.S. Army Materiel Command, subject: Medical Officer Responsible for Volunteers, dated 9 September 1974.

# CHAPTER V

## HUMAN VOLUNTEER SELECTION AND SCREENING

### General

The purpose of this chapter is to address the implementation of the Human Volunteer Program, to include recruiting and the thoroughness of the medical screening of volunteers.

As mentioned previously, volunteers have served the medical element of the U.S. Army Chemical Research and Development Laboratories since the establishment of the Medical Division in 1922.[1] Records indicated that prior to World War II the volunteers were employees of Edgewood Arsenal who usually were part of the various research test projects. During World War II there was large-scale use of volunteers at various test sites throughout the United States. Following World War II human volunteer resources were apparently met as they were prior to the war, i.e., by local assigned personnel. This was the case until May 1955 when the first contingent of the formal volunteer program arrived at Edgewood.[2] Very little is known about the recruiting methods, medical screening procedures, and utilization of the volunteers prior to 1955; nor was it determined if this void was the result of routine destruction of records or if there were simply fewer and less complete records maintained. It is probable that the Nuremberg Trials had a significant impact on the thoroughness with which research records were maintained. As discussed in Chapter IV, the Armed Forces Medical Policy Council established the rules of the Nuremberg Code as an essential part of future medical research involving the use of human subjects when in 1952 they recommended that the Secretary of Defense permit the use of humans in medical research.

Secretary of Defense Wilson's memorandum to the service secretaries in February 1953 established the procedures to obtain authority to conduct research with chemical agents involving human volunteers. However, program initiative still rested with the laboratory. It was the responsibility of the research investigator to justify the need to use humans in experimentations. There was evidence that this responsibility was not new to the Chemical Corps medical investigators, nor was it taken lightly. In fact, months before the Secretary of the Army had approved implementing instructions, the Chemical Corps Advisory Council was considering the impact of the new requirements the Nuremberg Code placed on them. On 20 and 21 March 1953 the Chemical Corps Advisory Council met at Edgewood Arsenal to consider these medical and related problems.[3] The Council members noted that human experimentation within the practice of medicine had been conducted for a long period of time, although usually on severely ill patients who went to a doctor for help. The Council stressed that the problems confronting the Chemical Corps were entirely different in that experiments would be performed on normal, healthy individuals and subjecting them to a certain degree of danger. Thus, they allowed that careful consideration had to be given and safeguards established in terms of the moral, ethical, and technical aspects of the problem of using humans. They reported that basic decisions would have to be made regarding the type of experimental work which was feasible and correct; the rules of conduct which would be followed to create the maximum safeguards; and the procedures which would be established to determine whether the information to be obtained would justify the risk involved. Following these considerations they reported that the practical problem of how to obtain a steady flow of human volunteers would have to be addressed.

The Council (which consisted of both military and nonmilitary members) discussed numerous problem areas, many of which are prevalent today. The Chairman of the Council (a civilian medical doctor) opined that "certain problems must be considered more adequately if normal subjects are to be used in experiments, the purpose of which is not to benefit the subject or people with disease, but to aid in military matters. The experimenter in each instance must be a physician, and, in view of the moral and ethical practices embodied in the Hippocratic Oath, it will be extremely difficult for the physician to judge, in an unbiased manner, the type of experiment to be performed and what the possible hazards are to the patient. From that point of view, consideration must be given to methods of choosing experimental subjects, what regulations govern the divulging of information to volunteer subjects as to the hazard involved, and whether or not that should, in any way, be the responsibility of the physician directly involved in the experiment." They also discussed the need to define "nonhazardous" experiments and those which may be hazardous to a degree and which would be considered line-of-duty (such as troop gas chamber exercises). The Council also recognized the need for a clear and overall set of fundamental principles, so that a proposed plan for experimentation could be evaluated in terms of those criteria, thereby avoiding individual decisions which would eventually result in a wide range of standards. Although there was no direct evidence to indicate the impact that this Council had on formulating future policy, it is apparent from the subject matter discussed that they had considerable expertise in the field of chemical and medical research, especially as it would involve human volunteers. The implementing authority, Chief of Staff Memorandum 385, for use of volunteers in research was published by the Army Chief of Staff on 30 June 1953.[4] This document set forth eleven basic principles for the use of human volunteers in research:

a. The voluntary consent of the human subject is absolutely essential and must be obtained in writing with a proper witness.

b. The experiment must be such as to yield results essential to the Army or for the good of society, unprocurable by other methods.

c. The experiment must be based on animal experimentation and knowledge of the problem so that the anticipated results will justify performance of the experiment.

d. The number of medical volunteers used shall be the minimum required to obtain the essential data.

e. The experiment will be conducted so as to avoid all unnecessary physical and mental suffering and injury.

f. No experiment will be conducted if there is any reason to believe that death or disabling injury may occur.

g. Proper precautions will be made and adequate facilities provided to protect the medical volunteer against all foreseeable possibilities of injury, disability, or death.

h. The experiment will be conducted only by scientifically qualified persons and the medical care of the volunteers supervised by a qualified physician.

i. The physician in charge must be prepared to terminate the experiment at any stage if he has any cause to believe continuation may result in injury, disability, or death.

k. The medical volunteer must be informed that at any time during the course of the experiment he has the right to revoke his consent and withdraw from the experiment, without prejudice.

l. Use of prisoners of war in human experimentation is prohibited under any circumstances.

The greatest emphasis in terms of detailed guidance was placed on the first of these principles, i.e., volunteer consent, which will be discussed in depth in Chapter VI.

A request to conduct experiments with nerve gases on volunteers was submitted in August 1953. Permission was granted in November 1953, however, it did not provide for a source of volunteer subjects. On 12 March 1954 The Surgeon General prepared a set of principles, policies, and rules for

for the use of human volunteers in medical research. With four exceptions, these principles generally were the same as those published in Chief of Staff Memorandum 385. The first rule was in the form of expanded guidance regarding volunteer consent. Next, rules 7 and 8 of the Chief of Staff Memorandum 385 guidance were expanded as follows: "Adequate preparations should be made and adequate facilities provided to protect the experimental subject against even remote possibilities of injury, disability or death. This includes hospitalization and medical treatment as may be required. The experiment should be conducted only by scientifically qualified persons (including an adequately trained physician) who shall be required to exercise the highest degree of skill and care throughout the experiment. Competent consultants should be available on short notice in this connection." Finally, there was included an additional rule: "Agents used in research must have the following limiting characteristics: controllable lethality; no serious chronocity anticipated; effective therapy available; and adequate background or animal experimentations." These were not intended to replace the rules set forth in the basic policy (Chief of Staff Memorandum 385), but rather to clarify their intent.[5]

Prior to this, in April 1953, the Chemical Corps Advisory Council recommended a system be developed to provide a pool of volunteers for chemical warfare research at the Army Chemical Center (Edgewood Arsenal).[6] This problem was again discussed by the Medical Committee of the Chemical Corps Advisory Council on 30 September 1954. The report of that meeting indicated a request for a continuing supply of volunteer subjects had been submitted to the Office of the Secretary of the Army and the official in charge of manpower in the Office of the Secretary of the Army had expressed approval of the request. Thus, favorable action was reportedly anticipated in time to have volunteers available by January 1955. It was further recorded that if such military volunteers were not supplied, the Medical Laboratories would have to continue obtaining a sporadic source of volunteers, both military and civilian, from the personnel of the Army Chemical Center. This comment was attributed to the Chief of the Clinical Research Division, Medical Laboratories, and is interpreted to mean that between the time formal approval for the use of volunteers was granted in November 1953 and the time of the Committee meeting (September 1954), volunteers were recruited from personnel assigned to Edgewood Arsenal. There were no volunteer medical records found which would corroborate this assumption. However, witnesses contacted during the inquiry stated such records normally were not kept for volunteers from the laboratory.

The Committee report also contained a statement that: "The Laboratories drew up a formal program and submitted it to the Secretary of the Army for approval (referring to the 7 August 1953 request for approval to test nerve agents in humans); approval for the plan had been received (referring to the 5 November 1953 approval by Secretary Stevens)." This program reportedly visualized four types of studies for human volunteers. "The first category consists of planned, hazardous experiments where there is a clear-cut risk, but with intelligent, adequate supervision, safeguards, and adequate therapy available, it is felt that no irrevocable damage will be done. Experiments will not be attempted where such damage can be foreseen. These form the type of experiments for which the Army Secretary's approval has been received and the only kind where such approval is required. Another category includes risk of accidental exposure to hazardous degree. The fullest possible studies should be made of any such unplanned exposures. The third category consists of experiments that are only potentially but not definitely hazardous. The experiments would be hazardous if the individual, despite previous examination and check-up, should prove unusually sensitive, or if there occurs an accidental error or break in technique. The fourth category of procedures will be those designated non-hazardous, experiments involving no hazard greater than that of crossing a highway."[7]

## Preparation for Volunteer Recruitment

On 13 October 1954 the Commander of the Chemical Corps Medical Research Laboratories submitted a request to the Commanding General, Chemical Corps Research and Engineering Command to establish a procedure for the recruitment of military volunteers for use in medical research associated with chemical warfare.[8] This request recommended establishment of an Army-wide volunteer recruitment program that would provide the Medical Research Laboratory a continuous flow of 20 volunteers per month. The request was forwarded to the Chief Chemical Officer, Department of the Army, on 13 October 1954. Based on a recommendation from the Office of The Surgeon General, the Medical Research Laboratory's proposal was disapproved in favor of a less expensive plan.[9] The alternate plan suggested that specific installations, such as Fort Meade, be contacted and the groundwork laid, through The Surgeon General's representative at each station, to obtain approval of the local commander to recruit volunteers from his installation. On 25 January 1955 the Army Chemical Center (Edgewood Arsenal) published the first known Standard Operating Procedure (SOP) dealing with military volunteers for chemical warfare.[10] The stated purpose of this memorandum was to outline the procedures for processing of military volunteers for medical research conducted at the Army Chemical Center by the Chemical Corps Medical Laboratories. The directive provided for the recruitment of volunteers from Second Army Headquarters at Fort Meade, MD, for temporary duty (TDY) at Edgewood Arsenal. The volunteers were to be provided administrative support, rations, quarters, and supplies upon arrival. Following these arrangements, volunteers were scheduled for physical examination and orientation relative to the test program. The directive also allowed the Medical Laboratory staff to retain the volunteer for observation and treatment beyond the normal attachment, if necessary. No mention was made of the details of the physical/mental examinations to be given prior to the volunteer's acceptance into the program or of a follow-up examination at the completion of his temporary duty.

Records found at Edgewood Arsenal indicated that during the period 9-23 January 1955 the Chemical Corps Medical Research Laboratories and the Aero Medical Laboratory, Wright-Patterson Air Force Base, conducted a joint research project at Wright-Patterson Air Force Base to investigate "Carbon Monoxide Gassing of Human Volunteers."[11] No authority for the conduct of this experiment was found during the inquiry. If approval was not sought because the test was considered "only potentially, but not definitely hazardous," and thus according to the earlier interpretation not requiring Secretary of the Army approval, it would have indicated, as a minimum, a propensity towards a liberal interpretation of policy. Also, it is possible that approval was obtained through U.S. Air Force channels, although no records of this were retained or found in the laboratory files. However, records were found which indicated that the Army Medical Laboratories supplied 10 volunteer subjects for the project; individual medical records for these volunteers were not located.

In late February 1955 the Medical Research Laboratories began their preparation for recruiting volunteers from Fort Meade by furnishing an information letter to the installation indicating the type of test planned for use of volunteers.[12] The volunteers were advised that three types of investigations would be conducted:

a. The minimum systemic and local effects of certain toxic agents, which would involve inhalation of small amounts of nerve gas. The document allowed that volunteers would be thoroughly informed about all procedures and what was to be expected during each test; every precaution would be taken to protect the volunteer against danger or serious discomfort; and physicians and other scientists who had previously been volunteer subjects would be in attendance at all times.

b. The evaluation of chemical warfare equipment, such as the testing of chemical items designed to protect the individual soldier. Testing of this equipment required wearing trials before the items were standardized.

c. Investigations involving the problems of adapting defensive items to natural human capacities, such as a manual dexterity test using protective gloves. Moreover, each volunteer was to be free to determine whether or not he desired to participate after he received a full explanation of the test procedure and he was to be free to terminate his 30-day temporary duty tour at any time.

Included with the information letter referenced above was a document titled: "Medical Research Volunteer Program," which was intended to be mandatory reading for all volunteers, and an acknowledgement that it had been read and understood was included in the "Human Volunteer Agreement" form. At the same time, the Medical Laboratory established an "Indoctrination and Screening Team" of two Chemical Corps officers and one medical officer to be responsible for selecting the qualified individuals from among the volunteers. The appointment of this team and other arrangements were made as a result of a commitment by 2nd Army Headquarters to provide 20 volunteers per 30-day period to the extent possible.[13] The letter also announced that the orientation and identification of individuals under consideration for selection would be accomplished only by personnel assigned to the Chemical Corps Research and Engineering Command. Further, 2nd Army would transmit and provide for exploitation of the preliminary recruiting material provided by the Chemical Corps. Additionally, 2nd Army would assemble prospective volunteers, as requested, for detailed orientation and final screening. However, 2nd Army would not engage directly in any aspect of the orientation and screening process. Available records indicated that during March and April 1955 Chemical Corps Medical Research Laboratories personnel developed a program in conjunction with Headquarters, 2nd Army, representatives and the chiefs of the various technical services (Quartermaster General, Chief of Engineers, etc.) to recruit, screen, and select volunteers from the 2nd Army area. On 21 April 1955 Headquarters, 2nd U.S. Army, published a directive to the installation commanders in its Army area establishing procedures for selecting volunteers.[14] The directive provided that when finally selected, the volunteer would be placed on TDY to Edgewood Arsenal for 30 days. The requirement for volunteers was established as 20 per month. The directive provided that when sufficient nominations were received, an orientation team from the Chemical Corps Research and Development Command would conduct a briefing for the volunteers. Those who still remained after the briefing would be requested to sign a volunteer participation agreement.

No direct evidence of the type medical and psychological examination given to these early participants was available, however, some newspaper articles published during the recruiting effort were located; they indicated that preliminary examinations were planned for volunteers. In March 1955 the Baltimore Evening Sun and the News-Post published articles about the upcoming experiments.[15] In these articles it was reported that the volunteers would be carefully screened for physical and psychological suitability prior to testing. In April 1955 a similar article appeared in the Army Times[16] which reported that "All volunteers would be screened carefully by three different groups to determine their physical and psychological suitability." The three groups, although not further identified, probably were: (1) the military unit, where potential volunteers were screened to insure they met the initial selection prerequisites: Intelligence (Aptitude Area I Score of 80 or above), completion of basic military training, physical profile (a general health rating established from medical examination and recorded in the individual medical records), age group of 17 to 35, remaining service of at least six months, and have an organization and Army official record which contained no adverse information; (2) the orientation team mentioned earlier that met with the volunteers after initial screening and prior selection for travel to the Medical Research Laboratories; and (3) the doctors who examined the volunteers at the Laboratories prior to participation in experiments.

## First Formal Volunteers from Second Army

The first contingent of 16 soldiers from Second Army Headquarters was reported to have arrived at the Army Chemical Center under this program on 2 May 1955.[1] A computer printout, based on data available from individual volunteer medical records, indicated that the first experimental use of these volunteers occurred on 20 May 1955.[17] A sampling of the available volunteers' records revealed that the medical examination of these early volunteers included: a standard report of medical examination; report of medical history; chest X-ray; urinalysis test; and an EKG recording. Many of the records, however, were incomplete in that they did not reflect the type of chemical agent administered to the volunteer, the method of administration of the drug, or the dosage given. It also was apparent that the original plan for medical evaluation of the volunteers did not include a final or exit type physical examination for the volunteers. However, arrangements to correct this oversight were made prior to the departure of the group that arrived in May 1955.[18] The exit examination provided during the 1955 time period appeared to consist of a chest X-ray and an exit interview. There was an indication that the purpose of the interview may have been for an evaluation of the volunteer's attitude in order to reinforce future recruiting efforts, rather than evaluation of his total medical well-being.

Volunteers from this source continued to arrive at Edgewood, during the remainder of 1955, from Fort Knox, KY, Fort Meade, MD, and Fort Monmouth, NJ.[19] Approximately 140 volunteers were received during 1955. The available records of these volunteers, which were, in most cases, incomplete, indicated that they received a medical examination, signed a volunteer statement (although not available in all cases), and were used in experimentations involving nerve and mustard gases and perhaps other agents. However, by June 1956 the number of volunteer subjects from Second Army and the various technical service installations dwindled to five or six per month. The Medical Research Laboratory stated that despite their vigorous efforts in recruitment of volunteers, troop commanders did not place sufficient priority on the program. They argued that Department of the Army should compel troop commanders to release volunteers despite shortages in other critical areas.[19] With the inclusion of psychochemical compound experimentation in 1956, the medical screening was expanded to include a social history interview and the Minnesota Multiphasic Personality Inventory (MMPI) to exclude those volunteers who might react adversely under situations of psychological stress. Although available records were not sufficiently complete to determine exactly when these tests were included, it appears they were being employed in early 1957 and perhaps late 1956, when the first volunteer records clearly indicated the use of LSD on volunteers.

## Continental Army-Wide Recruitment

In April 1957 the recruiting base was expanded to include all Army installations within the United States.[20] The Department of the Army directed Army commanders to assist in the recruitment of volunteers and to release a minimum of 30 per month on a rotating basis the six Army commanders were each given two months per year in which they would furnish volunteers). The term "Recruitment" was defined in other publications[1] as: "restricted to publicizing the program, accepting applications, and selecting a quota from among those who applied." No coercion or enticement of volunteers was permitted. The April 1957 directive held that: "The voluntary consent of the human subject is absolutely essential. This means that the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior form of constraint or coercion." It further provided that: "In all experiments involving volunteer test subjects, the individuals are thoroughly informed about all procedures, and what can be expected during each test." The Army commanders were asked to emphasize the program within their commands and to stress such matters as: the need for volunteers; thorough physical examinations; awareness of the application process; necessity of a volunteer agreement statement; quality of accommodations at the Edgewood Arsenal test site; a liberal pass policy for volunteers; availability of letters of commendation for volunteer service; and the availability of temporary duty (TDY) pay ($1.50 per day) to volunteers.[20]

The renewed emphasis placed on the recruiting of volunteers from all Army areas within the United States was apparently productive as the total volunteers received in 1957 was reported as 298 as compared to 100 for 1956.[21] Total volunteers for 1958 was reported as 383.[1] During this period (1955-1958) only two volunteers were reported as "physically unqualified."[1,21] It must be noted that official and unofficial documents discovered during the inquiry differ (in some instances considerably) in reporting the number of volunteers, and all figures are reported as the best evidence available rather than as absolute figures.

In late 1957 the Air Force agreed to furnish volunteers to the Chemical Corps. Records indicated that this practice continued until July 1961 and included approximately 350 airmen.[1]

During 1958, in addition to the normal clinical experiments conducted at Edgewood Arsenal, "field tests" were conducted with volunteers from Fort Bragg and Fort Holabird.[22] These tests will be discussed in separate chapters of this report.

## Recapitulation of Volunteer Utilization - 1962

By the end of June 1962 reports indicated 2,588 volunteers had been used at Edgewood since 1955; approximately 350 of these were Air Force personnel.[1] During the same period, 49 volunteers were reported as physically unqualified; 61 had requested release from the program; 35 were reportedly returned to their units for disciplinary reasons; and 6 had refused to participate in the program after arrival at Edgewood.[1] Figures available for the "use of volunteers" showed that 11% were used in lethal agent tests; 27% in incapacitating agent tests; 13% in miscellaneous physiological tests; and 49% in material tests.

## Medical Evaluation of Volunteer Subjects

Reports reflected that by 1962 volunteers spent their first three days at Edgewood receiving what was termed the most thorough physical examination they ever had. The examination, which was conducted by a physician, included chest X-ray, electrocardiogram, tests of liver and kidney function, as well as hematological tests (blood studies). The MMPI (Minnesota Multiphasic Personality Inventory) was reportedly given to all volunteers and scored by a psychologist or psychiatrist to determine behavior patterns of the volunteers. Successful completion of these tests qualified the subject for use in experiments with anticholinesterase compounds (nerve agents), riot control agents, some therapeutic drugs, and tests of protective material (which often did not involve drugs). If the volunteer passed these tests, he was given an electroencephalograph test, a personal interview with a psychiatrist, and a blood chemistry analysis. To be eligible for psychotropic drug experiments the volunteer had to successfully complete all screening tests.[1]

## Post-1962 Recruiting Procedures

In March 1962 the basic guidance for "Use of Volunteers as Subjects of Research" was published in AR 70-25. In July 1962 The Adjutant General, Headquarters, Department of the Army, published a letter to the Commanding General, U.S. Continental Army Command (CONARC), subject: Use of Volunteers in Research, authorizing procurement of volunteers by recruiting from the Zone of Interior (ZI) Army areas for temporary duty periods of 60 days.[24] The screening process was changed somewhat at this time. Army area commanders would select the major installation in their area where volunteers would be recruited. The post commander would survey his troops for potential volunteers, following which a Chemical Corps recruiting team would arrive at the post and present a briefing to an assembly of as many as 500 enlisted personnel. A follow-up Chemical Corps team would arrive later to review the medical histories of the potential volunteers and select 60 from those considered most eligible. The 60 men were placed on TDY orders to Edgewood Arsenal, where each volunteer again was given a standard physical examination without regard to the date of his last examination. Obvious medical rejects were dropped from the agent program immediately after a disqualifying finding was determined. In addition to the general physical examination, volunteers received a complete hemogram, urinalysis, serology, chest X-ray, EKG, EEG, liver and renal function batteries, psychological tests, and a psychiatric interview. The final selection of volunteers for the agent program was made by a board of medical officers who were permitted to reject volunteers who otherwise met all qualifications if, in their judgment, the subject should not be used. One report held that as of 15 December 1963, 2,863 volunteers had been available and were used in 2,279 exposures of 90 chemical agents.[24] These figures, although from official reports, cannot be considered absolute since they are in conflict with other official publications, and in some cases vary as much as 27% (Footnote 24 indicated that there were 218 volunteers available in 1957, while the publication in Footnote 1 showed 298 volunteers for the same period).

Records indicated that this volunteer selection system was still in use in July 1966 when the Commander of Edgewood Arsenal reported that, as of 1 July 1966, a total of 4,360 volunteer test subjects had been utilized in the medical research program at Edgewood Arsenal with no deaths, no injuries, and no observable residual effects.[25] On 17 January 1967 The Adjutant General, Department of the Army, again directed the Commanding General of the Continental Army Command to provide volunteers to Edgewood Research Laboratories.[26] This letter provided for the volunteers (average of 40 per month for 60 days TDY) to be medically screened by their station surgeon if a team from Edgewood could not be made available for that purpose. Otherwise, the directive was similar to those published previously.

## Evaluation of Volunteers for Use in Psychochemicals

Available historical records located during the research effort indicated that a comprehensive set of Standard Operating Procedures (SOPs) was available within the Clinical Research Department of the Medical Research Laboratories. One of these SOPs, published in 1968, dealt with "volunteer screening and selection" and provided detailed guidance for the psychological/psychiatric selection of volunteers.[27] It provided guidance for screening the medical history of the volunteer, evaluation of his general aptitude (GT Score), the MMPI test, family history, and other data. The final result of the screening process was to place each volunteer in a category of usefulness. A rating of "A" meant the volunteer [illegible] cleared for psychochemical testing; "B" meant he could receive a low-dose of psychochemicals only; "C" meant no psychochemicals could be used on the volunteer; and "D" meant the volunteer could be used for equipment tests only.

## Re-Evaluation of Volunteer Requirement - 1973

In general, the process of Army area commanders providing up to 500 personnel for orientations/briefings conducted by a team from Edgewood Arsenal continued through 1973, when Army organizational changes caused a re-evaluation of the method of recruitment. However, the screening and selection process for determining which volunteers qualified for use in which experiments remained about the same.

A review of the volunteer medical record files revealed that no records were retained for the period prior to May 1955, if, in fact, records were prepared at all then; and that from 1955 through 1958 most of the records were inadequate and incomplete. Gradual improvement was noted in both record completeness and the medical screening process starting in 1959. There were some notable exceptions to this general improvement trend; one such exception was evident in the comparison of official reports for the year 1960, which indicated that in excess of 500 volunteers were used at the Medical Research Laboratories. However, only approximately 40 volunteer records actually indicated that a chemical agent was administered. Other exceptions to good record keeping and medical screening processing were apparent in the lack of records concerning the military intelligence drug testing program conducted at Edgewood during 1958-1960, and to a lesser extent, the "field tests" conducted at Forts Bragg, Benning, and McClellan. These will be discussed individually in later chapters.

The reorganization of the Army, to include formation of the Training and Doctrine Command (TRADOC) and the Military Personnel Center Command (MILPERCEN) in 1973, required the Medical Research Laboratories to renew their efforts to obtain volunteers.[28] At the request of the Office of the Chief of Research and Development, Department of the Army,[30] the Biomedical Laboratory (formerly Medical Research Laboratories) submitted a justification to continue the selection process in a manner similar to methods used prior to the reorganization, i.e., have the area or post commanders assemble troops for orientation and briefing (installations to be selected by the newly formed TRADOC); and continue to have the initial screening process to preselect approximately 80 (formerly 60) volunteers for temporary duty at Edgewood Arsenal, where the second screening process would continue to take place. Additionally, the period of TDY was requested to be raised from 60 to 90 days to allow for better utilization of the volunteers.[29]

As of 30 June 1973 records reflected that 6,408 different volunteers had been used in medical research by the Biomedical Laboratory for a total of 6,709 volunteer tours (this includes repeat tours).[31]

It appeared that the change in Army organization did have an effect on the Biomedical Laboratory's recruiting efforts, although not immediately. By January 1974 there were no volunteers available and it appeared it would take six months to reinitiate the Laboratory's systematic selection process.[32] Volunteer records indicated that the program was again in operation by May 1974;[32] it continued until 28 July 1975 when the Acting Secretary of the Army directed a temporary suspension of all testing of chemical compounds at Edgewood Arsenal using human volunteers.[33]

## FOOTNOTES

## CHAPTER V

1. CRDL Special Publication 2-51. Evolution of the U.S. Army Chemical Research and Development Laboratories Medical Research Volunteer Program, published in November 1962.

2. Briefing text, Human Investigation Facility, Directorate of Medical Research, U.S. Army Chemical Research and Development Laboratories, Edgewood Arsenal, MD, 1963.

3. AC-723 Chemical Corps Advisory Council, Medical and Related Problems Committee Meeting, 20-21 March 1953.

4. Chief of Staff Memorandum for Chief Chemical Officer and The Surgeon General (CS:385), subject: Use of Volunteers in Research, dated 30 June 1953.

5. Principles, Policies and Rules of the Office of The Surgeon General, dated 12 March 1954.

6. AC 727 Chemical Corps Advisory Council Meeting, 23-25 April 1953.

7. AC(55)S-303 Medical Committee, Chemical Corps Advisory Council, 30 September and 1 October 1954, published in September 1955.

8. Letter, subject: Recruitment of Volunteers for Research Experimentation, from the Chemical Research and Engineering Command to the Chief Chemical Officer, Department of the Army, dated 13 October 1954.

9. Same as Footnote 19.

10. Memorandum Number 11, Military Volunteers, dated 25 January 1955.

11. Letter, subject: Appreciation for Cooperation in CO Studies, from Chemical Corps Medical Laboratories to Commanding General, WADC, Wright-Patterson Air Force Base, dated 1 February 1955.

12. Letter, subject: Recruitment of Military Volunteers, dated 24 February 1955.

13. Letter, subject: Recruitment of Military Volunteers, from Second Army to Commanding General, Chemical Corps Research and Engineering Command, Army Chemical Center, MD, dated 4 February 1955.

14. Letter, subject: Enlisted Volunteers for Chemical Corps Medical Laboratories, from HQ, Second Army, to Commander, Class I and II Installations, dated 21 April 1955.

15. News Article, The Evening Sun, Baltimore, March 28, 1955, "Chemical Device Tests Stated."

16. News Article, Army Times, April 2, 1955, "Army to Test New Poisons, Equipment on 20 Volunteers."

17. Computer printout of 9 January 1976 from Biomedical Laboratory, Edgewood Arsenal, of years, agent, dose, and date of administration.

18. Disposition Form, dated 19 May 1955, subject: Human Volunteers, from Chief, P&E Office, Medical Research Laboratories, to Asst/TCW Medical Research Laboratories.

19. Memorandum for Commanding General, CMC C RDCOM, subject: Recruitment of Volunteers for CW Research, dated 6 September 1956.

20. Letter Directive, subject: Use of Volunteers in Research, from Department of the Army, Adjutant General, to Commanding Generals, ZI Armies, dated 18 April 1957.

21. CWL Special Publication 2-13, U.S. Army Chemical Warfare Laboratories Report on The Medical Research Volunteer Program, printed June 1958.

22. Meeting of the Medical Committee, U.S. Army Chemical Corps Advisory Council, 3-4 November 1958.

23. Briefing notes of 1962, titled, "Volunteer Program at CRDL." Briefing by Major General Stubbs to Deputy Secretary of Defense.

24. Briefing text 1963, Human Investigation Facility, Directorate of Medical Research, U.S. Army Chemical Research and Development Laboratories, Edgewood Arsenal, MD. Title, "Volunteer Program."

25. Letter regarding "Use of Volunteers as Subjects of Research," dated 29 July 1966, from Commander, Edgewood Arsenal, to Commanding General, U.S. Army Medical Research and Development Command.

26. Letter, subject: Use of Volunteers as Subjects of Research, dated 17 January 1967, from The Adjutant General, Department of the Army, to Commanding General, U.S. Continental Army Command.

27. Clinical Research Department SOP No. 5, dated 12 August 1968, "Volunteer Screening and Selection."

28. Chief of Staff Regulation No. 601-1 (CSR601-1), Department of the Army, Office of the Chief of Staff, dated 27 March 1973.

29. Letter, subject: Requirement for Volunteer Program, Biomedical Laboratory, Edgewood Arsenal, dated 20 September 1973.

30. Letter, subject: TDY Personnel of Use as Volunteers to Research, dated 9 October 1973, from Chief of Research and Development, Department of the Army, to Commander, U.S. Army Materiel Command and The Surgeon General.

31. Booklet titled, "Recruitement and Selection of Medical Research Volunteers," prepared in 1973.

32. Letter, subject: Recruitment of Medical Research Volunteers, from Biomedical laboratory Director, to AMC, dated 8 January 1974.

33. News release, from Office of Chief of Information, Department of Army, dated 28 July 1975.

# CHAPTER VI

## INFORMED VOLUNTARY CONSENT

### General

The purpose of this chapter is to describe briefly the evolution of consent requirements, particularly standards regarding the essentiality, adequacy, and sufficiency of consent procedures.

The absolute essentiality of voluntary consent has been the stated policy of the Department of Defense and the Department of the Army since the inception of authority to conduct experimental research with human subjects. Secretary of Defense Wilson's memorandum allowed that participation of any human was subject to the condition of voluntary consent. This meant that "the person involved should have legal capacity to give consent; should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, overreaching, or other ulterior form of constraint or coercion; and should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision. This latter element required that before the acceptance of an affirmative decision by the experimental subject, there should be made known to him the nature, duration, and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment."[1] The memorandum further allowed that: "The duty and responsibilities for ascertaining the quality of the consent rests upon each individual who initiates, directs or engages in the experiment. It is a personal duty and responsibility which may not be delegated to another with impunity." This guidance came after a thorough evaluation of the results of the Nuremberg Trials and lengthy deliberations by the Armed Forces Medical Policy Council and was signed personally by the Secretary of Defense. Unfortunately, the guidance, sound as it seemed, was available to very few, due to the "TOP SECRET" classification placed on it. In fact, it was not declassified until August 1975, during the conduct of The Inspector General inquiry. However, on 30 June 1953 the Chief of Staff of the Army published a memorandum through the Assistant Chief of Staff, G-4, for the Chief Chemical Officer and The Surgeon General of the Army which implemented the Secretary of Defense's guidance.[2] This directive was initially classified "TOP SECRET," however, was regraded "CONFIDENTIAL" and then to "UNCLASSIFIED" in July 1954 at the urging of the Secretary of the Army.

Throughout the initial years of the Army volunteer program, the Chief of Staff's memorandum, known as CS:385, was cited at all echelons as the "basic policy." Thus, there is little doubt that commanders and investigators involved in the use of volunteers in research had access to the Secretary of Defense instructions regarding the essentiality of informed consent for all volunteer subjects. Nevertheless, there was evidence developed during this inquiry to indicate that in many cases consent was relegated to a simple, all-purpose statement to be signed by the volunteer. In March 1954 the Office of The Surgeon General of the Army set forth rules to govern the use of human volunteers in medical research.[3] The first of these rules stressed the essentiality of voluntary consent in terms similar to those cited in the "Wilson Memorandum" and Chief of Staff Memorandum 385. The third rule again emphasized that "Before the acceptance of consent of the volunteer, he must be given adequate explanation. He should be informed of the nature, duration and purpose of the experiment; the method and means by which it is to be conducted; all inconveniences and hazards reasonably to be expected; and the effects upon his health or person which may possibly come from his participation in the experiment."

A review of the minutes of the Chemical Corps Advisory Council meeting in March 1953 reflects that both military and civilian advisors were concerned with honoring the full intent of informed voluntary consent.[4] The Council discussed such germane problems as: the type of people that could be trusted to conduct experiments with humans; the ability of the investigator to present the hazards of the experiment to the volunteer in an unbiased manner; and the need to have the experiment clearly explained to the subjects beforehand, as well as a prognostication of the outcome of the experiment, to include informing the subject if the outcome was not known. They further discussed the need for a comprehensive signed statement in which the volunteer would indicate his awareness of the experiment and its associated hazards.

Volunteer Participation Agreement

The first record of volunteer agreement was found in an undated, draft form, probably prepared within the Medical Research Laboratories in late 1954.[5] The format of the initial proposed volunteer agreement is presented below in its original form as a point of departure for the discussion of future generations of volunteer agreements:

NAME ______________________________
AGE ______, RACE ______, GRAD ______, Serial No. ____________
Organization ______________________________
Name of Nearest Relative ______________________
Address of Nearest Relative ____________________
Telephone Number of Nearest Relative ______________

I, ______________________________, certify that the nature of the experiment I have volunteered to participate in has been explained fully from the standpoint of possible hazards to my health. I certify that I have been familiarized with the nature of the experiment and the agents to be used, commensurate with security requirements. It is my understanding that the experiment is so designed and based on the results of animal experimentation, of the natural history of the disease, or other problems under study that the anticipated results will justify the performance of the experiment. I understand further that the experiment will be so conducted as to avoid all unnecessary physical and mental suffering and injury, and that I will be at liberty to request that the experiment be terminated if in my opinion I have reached the physical or mental state where continuation of the experiment becomes impossible.

I recognize that in the pursuit of certain experiments transitory mental disturbance or unconsciousness may occur and when such reactions seem especially likely to occur I will be so advised. I recognize, also, that under these circumstances, I must rely upon the skill and wisdom of the physician supervising the experiment to institute whatever medical or surgical measures are indicated to protect me against the possibility of serious or permanent injury and/or disability, or death.

I certify that there has been no coercion, element of fraud or deceit, undue moral suasion or other adverse pressure brought to bear in my volunteering for this study. I have done so of my own free will, completely aware of all hazards, rewards and recognition involved.

DATE: ______________________ WITNESS: ______________________
SIGNED: ______________________ WITNESS: ______________________

Although not documented, it appeared that in February 1955 this draft form was forwarded by the Commander of the Medical Research Laboratories to the Commanding General, Chemical Corps Research and Engineering Command, for approval.[6] In March 1955 the agreement form was returned to the Medical Research Laboratories in a revised form.[7] Since only the revised agreement was attached to the returned indorsement, it cannot be determined with certainty that the draft form cited above was the one proposed. It is possible that the original draft was modified by the Laboratory Commander prior to dispatch. Nevertheless, the revised edition which was approved at the intermediate headquarters, with the concurrence of the local legal advisor, represented a substantial change in the content of of the original proposed agreement. The first two sentences of the draft agreement (underlined in the draft quoted above) were changed to read: "I, __________, certify that I received, read and understand a document entitled, Medical Research Volunteer Program, dated 15 March 1955, copy of which is annexed hereto, and that the general nature of the experiments I have volunteered to participate in have been explained from the standpoint of possible hazards to my health." It was noted that the revision eliminated the word "fully" from the first sentence and eliminated the second sentence entirely, i.e., "I certify that I have been familiarized with the nature of the experiment and the agents to be used, commensurate with security requirements." Additionally, the words "mental disturbance or unconsciousness" found in the draft were replaced by the word "discomfiture." There was no evidence found which would indicate the proposed format for volunteer agreements was ever staffed at Headquarters, Department of the Army, level, for either staff information or approval. However, no evidence was found which would indicate that such approval or coordination was required. It was clear, however, that the Department of Defense, Department of the Army, and The Surgeon General intended that the volunteer be given sufficient knowledge upon which to base an understanding and enlightened decision. Judged solely by the content of the agreement the volunteer was required to sign, the intent of the informed consent policy did not appear to have been fulfilled, since the revised form did not require disclosure of the chemical agent to be used or the full effects of the drug, nor did the publication appended to the volunteer agreement form contain that information. It is possible, however, that the detailed knowledge needed by the potential subject to make a fully informed consent was intended to be presented to him by means other than the "volunteer's participation agreement." Assuming that was the case, it may have been intended that the publication "Medical Research Volunteer Program" cited in the agreement, accompanied by a verbal explanation at the time of the experiment would provide the volunteer subject the required knowledge.

The "Medical Research Volunteer Program" publication[8] contained a general discussion of the purpose of the program, use of medical research volunteers, the current program, special problems of discipline and clinical facilities, volunteer recruitment, history of the program, and the cost of the program. Under the topic of current program it contained a brief, general discussion of such matters as: authority; Air Force and Navy participation; administration; prerequisites for selection; inducements for volunteers; operation of the medical research volunteer program (including quarters, rations, volunteer agreement, physical and psychiatric examinations, and test requirements); and scheduling of volunteers' participation. Reading and understanding this document would appear to provide the potential volunteer knowledge of the overall program and the environment in which he would serve his temporary duty, but would not provide detailed knowledge regarding the specific experiment or agent to which he would be exposed.

The second adjunct which was mentioned in the basic agreement, i.e., "an explanation from the standpoint of possible hazards to my health," presumably would have been given by the medical investigator just prior to the conduct of the actual experiment. However, a random review of the available volunteer records failed to disclose evidence of such an explanation prior to approximately 1964. Later, some records reflected an indication that some additional information may have been presented to the volunteer prior to a particular experiment. In these cases, the statement was stamped on the back of the basic agreement and read: "The nature of the proposed experimental procedure has been personally explained to the undersigned and he agrees to participate as a volunteer." The statement was signed by the volunteer and a medical officer. This statement was similar to one cited in an Edgewood Arsenal Information Paper of August 1975 and was reportedly used during the 1967-1974 time period.[9] The wording of the statement was open to the conjecture of whether the explanation included matters regarding the specific agent and its effects or merely the experimental procedure. At any rate, documentary evidence of even this minimal compliance effort was not found for the early years (1955-1962) of the program. To the contrary, evidence that full explanations were not given was found in the form of a news article[26] and personal letters from former volunteers seeking additional information regarding their participation.[27,28] Although the basic volunteer participation agreement was republished on several occasions between 1955 and 1975, only one other change was evident, that being the elimination of the date of publication of "Medical Research Volunteer Program." Available evidence of this change indicated it was made in 1960,[10] but could have been earlier. A new form initiated in 1975 was the first major revision since 1955.[9] It appeared to better meet the intent of informed voluntary consent. The revised form reads as follows:

> I, ______________________________, having attained my eighteenth (18th) birthday, and otherwise having full capacity to consent, do hereby volunteer to participate in an investigational study entitled:
>
> ____________________________________________________________
>
> ____________________________________________________________
>
> under the direction of ________________________________________
>
> The implications of my voluntary participation; the nature, duration and purpose; the methods and means by which it is to be conducted; and the inconveniences and hazards which may reasonably be expected have been explained to me by ______________________, and are set forth on the reverse side of this Agreement, which I have initialed. I have been given an opportunity to ask questions concerning this investigational study, and any such questions have been answered to my full and complete satisfaction.

I understand that I may at any time during the course of this study revoke my consent, and withdraw from the study without prejudice, however, I may be required to undergo certain further examinations, if in the opinion of the attending physician, such examinations are necessary for my health or well being.

Signature Date

I was present during the explanation referred to above, as well as the Volunteer's opportunity for questions, and hereby witness his signature.

Witness' Signature Date

## Informed Consent

The "Wilson Memorandum," the Chief of Staff Memorandum 385,[2] and The Surgeon General principles[3] all provided that the human subject "should have sufficient knowledge and comprehension of the elements of the subject matter involved as to enable him to make an understanding and enlightened decision."

All available evidence indicated that with one exception, which will be discussed under the chapter on intelligence testing, only volunteer subjects were used for the chemical drug or agent experiments by Army investigators. Moreover, the great majority of the volunteers signed formal volunteer agreements, prior to participation in experiments. These facts were made abundantly clear through formal testimony of former Medical Research Laboratory Commanders and investigators;[11,12,13,14,15] review of official reports (cited elsewhere in this report); review of available volunteer records; interview of former volunteers; and informal discussions with Medical Laboratory employees. Thus, the question was not whether the subjects volunteered, but whether they were provided sufficient information to permit an enlightened decision. Several factors were apparently weighed by the medical investigators in an evaluation of the depth of knowledge made available to the volunteer. These factors were: security requirements surrounding the experimental agent or testing procedure; invalidation of the objectivity of the test results through suggestion of what was expected of the volunteer under the influence of the drug/agent (placebo effect); depth of available knowledge and personal convictions of the investigator regarding effects of the experimental compound; and a judgment of what information would be of value to the volunteer subject in making his decision. This is not to say that these factors, when reviewed in respect to present knowledge, were valid considerations, but, rather, it is to point out that there was apparent concern at the time the experiments were conducted. The first of these factors was a concern which was reflected in the initial draft participation agreement[5] and which stated: "I certify that I have been familiarized with the nature of the experiment and the agents to be used, commensurate with security requirements." Although this phrase was not found in the approved edition of the volunteer agreement, neither was a reference to disclosure of the agent. Thus, the approved agreement removed the mandatory requirement for the investigator to disclose the actual agent or to determine the security classification of the drug/agent and match it against the security clearance of the volunteer. It is difficult to imagine an investigator withholding the identification of the experimental agent from the volunteer because it was highly classified, and there was no evidence found of this happening. On the other hand, if a medical investigator simply apprised the volunteer subject that he was about to receive an experimental agent called EA 1476 or EA 1729 or LSD or any other Laboratory related nomenclature, this would appear to be nothing more than paying "lip service" to the requirement. Therefore, disclosure of the agent name or withholding it might not have been material to the volunteer's decision process at the time of the experiment. However, it would seem appropriate that the volunteer should have been provided, sometime during the volunteer period, the medical name of the drug in the event of future adverse reactions.

Concern for the objectivity of the experiment was reflected in the Army Regulation (AR 70-25), 31 July 1974, governing the use of volunteers as subjects of research,[16] which provided that: "He will be told as much of the nature, duration, and purpose of the experiment, the method and means by which it is to be conducted, and the inconveniences and hazards to be expected, as will not invalidate the results." If that statement extracted from the context of the regulation appears bland and inconsistent with the intent of informed consent, such does not appear to have been the intent. Rather, the purpose was to illuminate that the objectivity of test results was a concern of the medical investigator. The 1962 edition of the regulation contained a similar caution. No evidence was found which would indicate that any investigator allowed the volunteer to accept greater risks to his health or well-being simply for the sake of more objective test results.

Finally, there is the question of how much of his own knowledge and possible contrary opinions did the investigator have to relate to the volunteer. Evidence reviewed during the research effort indicated that the medical research personnel employed at the Chemical Corps Medical Research Laboratories were among the most knowledgeable in their field and that they were kept abreast of related research findings by civilian investigators. Nevertheless, there were no records located which would corroborate or establish that the investigators presented all the medical evidence available to the volunteer. Nor could it be determined that what was reported as evidence by one investigator was accepted as such by another.

The problem of voluntary consent was not peculiar to the Army; it was common to all medical investigators. In June 1966 Dr. Henry K. Beecher, of Harvard Medical School, a long-time consultant to the Army Surgeons General,[19] addressed the problem of consent in a special article for the New England Medical Journal,[18] in which he wrote: "All so-called codes are based on the assumption that meaningful or informed consent is readily available for the asking, . . . this is very often not the case. Consent in any fully informed sense may not be obtainable. Nevertheless, it remains a goal toward which one must strive for sociological, ethical and clear-cut legal reasons. There is no choice in the matter. If suitably approached, patients will accede, on the basis of trust, to any request their physician may make. At the same time, every experienced investigator knows that patients will often submit to inconvenience and some discomfort, if they do not last very long, but the usual patient will never agree to jeopardize seriously his health or his life for the sake of science." His article continued: "In any precise sense, statements regarding consent are meaningless unless one knows how fully the patient was informed of all risks, and if these are not known, that fact should also be made clear. A far more dependable safeguard than consent is the presence of a truly responsible investigator." On 28 June 1966 Dr. Beecher's article was relayed to Edgewood Arsenal by the Commanding General of the Medical Research and Development Command.[20] He urged the Commander at Edgewood to be alert to the requirement for informed voluntary consent on the part of each volunteer subject. One month later the Edgewood Arsenal Commander responded.[21] He reported that a copy of the Beecher article had been furnished to all professional personnel at the Medical Research Laboratories. Moreover, he stated that "all volunteer test subjects, after a thorough indoctrination and briefing on the program in which they are participating, sign a volunteer participation agreement in triplicate. Such procedure has been reviewed and approved from the legal standpoint by representatives of the JAG." His reply implied that the agreement signed by the subject was used for the protection of the doctors and the Army in general and not specifically as a means of communicating the hazards of an experiment to the potential volunteer, which was apparently the function of the briefing that reportedly preceded the signing of the agreement. However, documents regarding recruiting procedures and some volunteer records indicated that in most cases the agreement was signed prior to arrival at Edgewood Arsenal, or on the first day after arrival. In either case, it was usually signed before the subject was selected for a specific agent test. Therefore, it was not likely that meaningful information regarding all hazards to his health were provided the volunteer prior to his signing the participation agreement. Thus, it was apparent that full compliance with the "informed consent" requirement relied upon oral communication between the responsible physician and his patient, and upon the Army's ability to insure the presence of the required number of truly responsible investigators. Evidence that more than 7,000 volunteers were tested at Edgewood Arsenal without a single fatality or serious injury must be accepted as supporting evidence of the ability of the U.S. Army and the medical research staff to fulfill their responsibilities.

## Command Influence and Inducement

The problem of enticing soldiers to volunteer for the Chemical Corps medical research program was first discussed at the Chemical Corps Advisory Council meeting in March 1953.[4] At that time, a legal advisor to the Chemical Corps opined that any offers of rewards or special privileges or other enticements, to include "hazardous duty pay" might be construed as coercion and thereby negate the intent of the volunteers' free choice. In this regard, Chief of Staff Memorandum 385 (basic authority for use of volunteers in research) provided that the volunteer "should be so situated as to be able to exercise free power of choice, without the intervention of any element of force, fraud, deceit, duress, over-reaching, or other ulterior form of constraint or coercion. . . ."[2] The current regulation (AR 70-25, 31 July 1974) governing use of volunteers as subjects of research provided that the volunteer "must give consent freely without being subjected to any force or duress."[16]

Evidence assembled during the research effort reflected that several inducements were offered to persuade the soldier to volunteer. Those inducements were listed in an official publication and presented to installation commanders throughout the Army for publication as recruiting material.[8] They included: 30 days of temporary duty (TDY) at $1.50 per diem or $45 per month (more than half of a private's monthly pay in many cases); promise of a three-day pass each weekend; better living and recreational accommodations than normally available at many troop installations, such as air-conditioned rooms and hospital type beds; relief from all fatigue type details; an opportunity to receive a medical examination not normally available during other military duty assignments; a guarantee of a letter of commendation that would be placed in the volunteer's official personnel file; and a sense of patriotic contribution to the nation's national security.[23] These rewards may appear minimal when viewed in terms of today's Army and economy, however, in the 1950s and early 1960s they represented substantial rewards. No evidence was found to indicate that any of the privileges were unauthorized or illegal, however, the emphasis placed on them during recruiting efforts appeared to be an attempt to influence the prospective subject's decision by offering promises of special privileges or rewards.

Another matter discussed during the Chemical Corps Advisory Council meeting of March 1953[4] was the need to remove any appearance of military duty from the recruiting process. In other words, the soldier was not to be given any reason to believe that he was expected to volunteer or that volunteering his services was considered a part of his military duty. Although it was not established that commanders or recruiters misused their authority, rank, or position to influence soldiers to volunteer, there were indications that application of the power of command, expert knowledge, and position were employed in a manner to suggest possible coercion. The initial Army directive that authorized recruitment of volunteers in 1957[22] did more than merely extend the geographical area from which volunteers could be sought; it also assigned the Army area commanders a quota of volunteers to be furnished on a monthly basis. The reasons for the directive were twofold: first, inadequate numbers of volunteers were forthcoming from the Second Army area, which was the previous area of recruitment, and second, it was to impress unit and installation commanders of the need to provide volunteers. Clearly, the directive advocated strict observance of the highest ethical and moral practices in all recruiting efforts. Still, it is not unreasonable to assume that the Army area commander would consider himself obligated to emphasize the program to the extent necessary to fulfill his quota. Evidence of the method of recruitment indicated that installation commanders would direct the assemblage of a minimum of 300 enlisted men without regard to the volunteer prerequisites for the purpose of a specialized briefing given during normal duty hours by a Medical Research Laboratory recruiter.[24] The assignment of quotas to military commanders, the involuntary assemblage of large numbers of soldiers, and the skillful presentation of selected material regarding the volunteer program by a military officer (in some cases a physician) could have given the potential volunteer the impression that his participation was directly related to performance of his military duties.

In retrospect, full compliance could have been obtained by assigning commanders ceilings rather than quota; and orientation briefing attendance should have been strictly voluntary and conducted during nonduty hours. Moreover, local commanders should have been provided more detailed information about the program to permit an adequate review of the presentation to insure that his troops were aware of all the facts available. The latter responsibility apparently was neither recognized nor fulfilled in the early years of the recruiting efforts and perhaps not in later years as well. An example of this failure was reflected in a February 1955 letter from the Chief of Staff, Second U.S. Army, which announced that Second Army would only be responsible for the assembly of prospective volunteers and that all orientation, identification, and selection of volunteers would be handled entirely by Chemical Corps personnel.[23] Other forms of subtle pressures applied to persuade military personnel to volunteer will be discussed in later sections concerning field tests.

In summary, the evidence clearly reflected that every possible medical consideration was observed by the professional investigators at the Medical Research Laboratories; volunteers were not fully informed, as required, prior to their participation; and the methods of procuring their services, in many cases, appeared not to have been in accord with the intent of Department of the Army policies governing use of volunteers in research.

## FOOTNOTES

## CHAPTER VI

1. Memorandum for the Secretary of Army, Navy, and Air Force, from Secretary of Defense, subject: Use of Human Volunteers in Experimental Research, dated 26 February 1953.

2. Memorandum through Assistant Chief of Staff, G-4, for Chief Chemical Officer and The Surgeon General, from Chief of Staff of the Army, subject: Use of Volunteers in Research, dated 30 June 1953.

3. Document, subject: Use of Human Volunteers in Medical Research, Principles, Polices and Rules of the Office of The Surgeon General, dated 12 March 1954.

4. Chemical Corps Advisory Council Meeting of March 1953, Medical and Related Problems Committee minutes.

5. Draft Volunteer's Participation Agreement, prepared by Chemical Corps Medical Laboratories, Army Chemical Center, MD, undated.

6. Letter, subject: Human Volunteer Agreement Form, from Commander, Medical Research Laboratories, to Commanding General, Chemical Corps Research and Engineering Command, dated 24 February 1955.

7. 1st Indorsement to Letter in reference 6, dated 17 March 1955, from Commanding General, CMLC R&E Command, to Commander, Medical Research Laboratories.

8. Chemical Warfare Laboratory Special Publication 2-13, The Medical Research Volunteer Program, dated June 1958.

9. Information Paper, subject: Policy Review for Use of Human Volunteers, from Edgewood Arsenal, dated 29 August 1975.

10. Volunteer's Participation Agreement, U.S. Army Chemical Research and Development Laboratories, U.S. Army Chemical Center, MD, A CMLC Form 6-9, Revised 22 June 1960.

11. Testimony of Dr. (COL, Ret) Norman W. Elton.

12. Testimony of Dr. (COL) James S. Ketchum.

13. Testimony of Dr. (COL, Ret) Joseph R. Blair.

14. Testimony of Dr. (COL, Ret) Nicholas G. Bottiglieri.

15. Testimony of MAJ (Ret) Robert Clovis.

16. Army Regulation 70-25, dated 31 July 1974, Use of Volunteers as Subject of Research.

17. Chemical Corps Medical Laboratories Special Report MLSR Nr 71, First Psychochemical Conference, dated 12 May 1954.

18. Article, New England Medical Journal, by Henry K. Beecher, M.D., "The Problem of Consent," dated June 16, 1966.

19. Surgeon General Directive, Establishment of Ad Hoc Advisory Committee on Use of Volunteers as Subjects of Research, dated 9 December 1963.

20. Commanding General, Medical Research and Development Command Letter, subject: Informed Consent, to Commander, Edgewood Arsenal, dated 28 June 1966.

21. Commander, Edgewood Arsenal, Letter, subject: Informed Consent, to Commanding General, Medical R&D Command, dated 29 July 1966.

22. Department of the Army Letter to Commanding Generals of ZI Armies, subject: Use of Volunteers in Research, dated 18 April 1957.

23. Headquarters, Second U.S. Army, Letter to Commanding General, Chemical Corps Research and Engineering Command, subject: Recruitment of Military Volunteers, dated 4 February 1954.

24. Chemical Research and Development Laboratories Special Publication 2-44, subject: Medical Research Volunteers, dated August 1961.

25. Army Materiel Command Letter to TRADOC and FORSCOM, subject: Recruitment of Medical Research Volunteers, dated 25 June 1973.

26. Army Times Article of 14 February 1959, titled, "2 Men Cited as Human Guinea Pigs," from Camp Irwin, CA. "Neither of the men was told what he was doing. Regularly they swallowed pills, took shots and underwent periods in the gas chamber, but neither of the men knew what he was taking or what the experiments might prove."

27. Personal Letter from Army Private to the Commander of the Medical Research Laboratory, dated 5 December 1970, requesting details of the type of psychochemical drug, dose and possible effects on his future offspring.

28. Personal inquiry from Army Specialist on 11 August 1967 requesting knowledge of drug he had received seven months earlier and its possible effect on his mental health.

# CHAPTER VII

# INITIAL CHEMICAL WARFARE AGENT EXPERIMENTATION AT EDGEWOOD ARSENAL

## General

The purpose of this chapter is to briefly describe the research conducted at the Medical Research Laboratory as a preliminary to and concurrent with human studies. Additionally, it will highlight the methodology of the research, to include supervision, controls, staffing, medical facilities, and the quantity of volunteers used at Edgewood Arsenal in chemical warfare testing.

## Edgewood Arsenal

Edgewood Arsenal, located approximately 20 miles northeast of Baltimore, MD, was originally purchased in 1917 and named Gunpowder Reservation. It was renamed Edgewood Arsenal in 1918 when it became the home of the newly formed Chemical Warfare Service. The importance of the Reservation was increased in 1920 when the Chemical Warfare School moved from Lakehurst, NJ, to be co-located with the Chemical Warfare Service at Edgewood. Edgewood continued to develop as the hub of chemical warfare activities; in 1942 it was renamed the Chemical Warfare Center with the following sub-commands: Chemical Warfare Technical Command; the Chemical and Medical Laboratories; a Proving Ground; Chemical Warfare School; Chemical Officer Candidate School; Chemical Warfare Board; and the Eastern Chemical Depot. By 1946 the population of the command was approximately 17,000 military and civilian employees; at which time it was renamed the Army Chemical Center. Organizational titles changed frequently between World War II and the start of the Korean War, but the post remained the focal point of Army chemical warfare activities. By 1951 there were three major subordinate commands located at the center: the Research and Engineering Command (formerly the Technical Command); the Materiel Command (MATCOM); and the Training Command. The Research and Engineering Command consisted of the Chemical Research Laboratory, Medical Laboratory, and the Engineering Agency. A year later the Medical Laboratory was renamed the Chemical Corps Medical Laboratories; the Training Command (including the Chemical School) relocated to Fort McClellan, AL. Prior to the summer of 1962 the various organizations and activities located at the Army Chemical Center were under the control of the Chief Chemical Officer, Department of the Army. Following a major Army reorganization in 1962 the post became the responsibility of the newly formed Army Materiel Command. Also in 1962, the title of the installation was changed back to Edgewood Arsenal. A year later the Arsenal absorbed the Munitions Command (initially a control headquarters under the Army Materiel Command); the Arsenal headquarters also assumed operational responsibility for Fort Detrick, MD, Pine Bluff, AR, and Rocky Mountain Arsenal, CO, which were designated as sub-posts of Edgewood. In 1966, however, the Biological Research Laboratory at Fort Detrick was separated from the Edgewood command. Finally, in 1971 Edgewood Arsenal was merged with another nearby Army Materiel Command installation, Aberdeen Proving Ground. Essentially, Edgewood Arsenal has been the center of chemical warfare research and development for the past 57 years. Therefore, it is not strange to find that the great bulk of the use of volunteers in medical (chemical) research was conducted at that installation. Moreover, the majority of the Army's experts in the chemical research field were stationed at Edgewood.[1]

In addition to being the research hub involving human subjects, Edgewood served equally important functions in the development of chemical compounds and the conduct of preliminary tests to insure that human testing was safe and productive.

The preliminary laboratory research was absolutely necessary in order to insure compliance with the basic policy governing the use of humans in research, Chief of Staff Memorandum 385, which provided: "The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature. The number of volunteers used shall be kept at a minimum. The experiment should be so designed and based on the results of animal experiments and a knowledge of the natural history of the disease or other problem under study that the anticipated results will justify the performance of the experiment. The experiment should be so conducted as to avoid all unnecessary physical and mental suffering and injury. No experiment should be conducted where there is a prior reason to believe that death or disabling injury will occur. The degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment. Proper preparations should be made and adequate facilities provided to protect the experimental subject against even remote possibilities of injury, disability or death. The experiment should be conducted only by scientifically qualified persons. The highest degree of skill and care should be required through all stages of the experiment of those who conduct or engage in the experiment."[2]

In order to be in full compliance with the Department of the Army regulations and policies, scientists were involved in a great deal of painstaking research long before volunteers were used. The preliminary work often took years.

The first and perhaps foremost prerequisite for the conduct of a quality program would appear to be the availability of scientifically qualified persons. In that regard, historical reports reflected that in 1954 the Medical Research Laboratory was staffed with an abundance of highly qualified personnel. There were 32 college educated officers, 12 of which were medical doctors from some of the country's best medical schools, 3 of the officers held Ph.D.s, and 1 was both a Ph.D. and an MD. Of the 130 enlisted scientific and professional personnel (ESPP) assigned, 128 held college degrees, 55 held Master of Science degrees, and 11 were Ph.D.s. The 117 civilian employees ranged in grade from GS-7 to GS-17 and included numerous Ph.D.s and MDs from such leading universities as: Harvard Medical College, University of Munich, University of Pennsylvania, John s Hopkins University, Princeton University, Cambridge, Duke, University of Berlin, Columbia, Cornell, and Stanford.[1] In addition to its own select staff, the Medical Laboratories had continuous input from the private sector of medical research in the form of contractual arrangements, chemical and medical advisory councils, industrial liaison, and published literature.

The medical and laboratory facilities and equipment were reported as among the best available. The current modern facilities were opened in 1968. Thus, with a competent staff and complete facilities, the Medical Research Laboratory at Edgewood was in an excellent position to conduct the preliminary research necessary to insure that only the most promising chemical compounds were used on human subjects.

## Preliminary Procedures

There were several ways that chemical compounds came to the attention of the Medical Research Laboratories. Some of those were: discovery by Medical Laboratory employees through basic research or during experiments with other chemicals; review of professional literature; accidental or intentional discovery by industry; and recommendations from other medical research institutions (both in the U.S. and other countries).

However, the most prevalent source of chemical compounds appeared to be from the Chemical Corps Industrial Liaison Program. An example of this method was the discovery of benzilates (BZ), the most useful of the known incapacitating agents developed by the Chemical Corps. It was reported that as of October 1960 the most potent benzilate candidate agent under consideration by the Chemical Corps was agent EA 2277. Reportedly, it was obtained in 1958 through the Chemical Corps Industrial Liaison Program from Hoffmann-LaRoche, Inc., of Nutley, NJ, where animal and limited human exposures had been conducted prior to nominating the agent to the Chemical Corps.[3]

The Chemical Corps screened this compound, along with thousands of others received from their various sources, to determine its potential military usefulness. Once the compounds with potential military value were selected from the mass of candidate agents, more detailed studies would begin. These studies were known as "initial toxicity screening." Between 1950-1975 approximately 34,500 compounds were studied. Following the initial screening, each compound was reviewed in light of its potential military value. Records reflected that 2,077 agents survived the initial review. Those agents selected for further chemical analysis were divided into three general categories: proposed irritants; incapacitants; and lethal agents.

The proposed incapacitating agents were next studied in animal behavior tests, using several different species (still in the chemical laboratories). Next, the candidate agents were presented to the Medical Research Laboratories for additional research. Initial medical research included an evaluation of the data available from the Chemical Laboratory, evidence from industry, private institutions, and technical literature. Additionally, the laboratory staff conducted pathology and pharmacology studies. Following these evaluations, a second major review was conducted to further reduce the number of candidate compounds. Records reflected that 2,026 of the available 2,077 agents were rejected at this stage of the research cycle. The remaining 51 candidate agents were submitted for pre-clinical testing at the Medical Research Laboratories.

The next laboratory studies involved research in numerous animal species, prophylaxis studies, and therapy studies. Only 32 candidate agents reportedly survived the pre-clinical research phase of the cycle. Those agents were selected for clinical testing with volunteers.[4]

It is important to note that candidate agents entered into the research life cycle throughout the 25-year period. Moreover, they did not proceed at a uniform speed, rather, their rate of progress was dependent upon the priority given the agent and the state-of-the-art in relation to the agent.

Once the agent passed the pre-clinical or animal testing phase it was considered safe for human experiments. This belief was presented to Congress in 1959 by the then Chief, Clinical Research Division, Chemical Warfare Laboratory, Army Chemical Center, MD, when he testified regarding the Volunteer program at Edgewood. He stated that the volunteer program had been conducted for four years and it "Encompasses medical protection and medical treatment against lethal compounds as well as the study of compounds which we feel are perfectly safe to put in the human. To say safe it means extensive work over a period of years in which we are totally satisfied that there are no acute effects from this compound that persist and there are no chronic effects that may come later."[5]

Available records and testimony indicated that once an agent was determined to be acceptable for human experimentation, a formal protocol had to be submitted (assuming it was a new agent) to obtain approval for use in humans. This request (the detailed procedure was discussed in an earlier chapter) was submitted through Chemical Command channels, through The Surgeon General, for the Secretary of the Army's approval. Once the authority to use volunteers to test a specific class of drugs was granted, a detailed research plan was prepared by the medical investigator.

The plan normally included a listing of the investigators, to include the medical doctors, clinical research assistants, Medical Service Corps personnel, nurses, and aidmen required; full justification for the experiment; the objective of the experiment; the estimated time and cost of the experiment; a detailed description of the approach to be used to arrive at the objective of the experiment; technical considerations such as special equipment or procedures required during the conduct of the experiment; a description of each drug planned for use during the experiment; a detailed listing of all references relating to the experiment and similar earlier experiments; the number of volunteers required for conduct of the experiment, along with the prerequisites those volunteers must meet in order to qualify as suitable subjects; the name of the responsible physician and where he could be contacted on a 24-hour basis; and a complete list of safety requirements and considerations peculiar to the experiment.

Prior to execution, the plan had to be approved by a Medical Board, which normally consisted of: the responsible physician; the Chief of the Clinical Research Branch; the Chief of the Medical Research Division; the Deputy Director of the Biomedical Laboratory; and the Director of the Biomedical Laboratory.[6] Although the titles and membership of the Medical Board and the formal nature of the approval varied somewhat over the 25-year period, the practice appeared to be generally the same.

Following the research life cycle, formal protocol approval for use of the drug, local Medical Board approval of the experimental plan, and often the self-exposure of the investigator, the experiment was ready for use on volunteers recruited and screened under the volunteer program. It should be noted that although some witnesses indicated that the medical investigator always tested a new compound or agent on himself before using it on a volunteer, such was not the case. There was no evidence of a general practice or unwritten requirement to do this or even that a majority of medical investigators supported such a practice.[7]

The specific number of volunteers authorized in the research plan was selected from the pool that was available at the Medical Research Laboratory. Methods of briefing, selection, supervision, and control varied according to the type of experiment, desires of the medical investigator, and local policy. However, evidence of a 1964 LSD experiment at Edgewood appeared to represent the normal method of conducting volunteer experiments with that type of drug.[8] In that experiment, the investigator's reports indicated that 16 subjects were selected from a group of 45 volunteers on the basis of a psychiatric interview. Also, all 16 had previously received a complete physical examination, laboratory studies which included EEG, MMPI, and an interview by the screening psychologist. The 16 subjects were explained the program in general terms, told of specific drug tests, and other test activities that would take place. All the men readily agreed to participate. The group was then assigned to the same set of squad rooms and a senior master sergeant with neuro-psychiatric training and experience was assigned to a room in the same area. Further, each individual was assigned a specific partner, from among his roommates, with whom he would always be scheduled on any test he would undergo. Other controls that were reported were: each individual would complete a personal check list twice daily (the report would list his mood, health, administrative complaints, and comfort); the master sergeant supervisor would tabulate the lists daily and initiate any required corrective action. Each individual met bi-weekly with a psychiatrist to learn more of the process and to vent his personal opinions. Finally, the report held that all psychochemical studies required nurses to be in attendance on a 24 hours a day basis and the maintenance of detailed behavior check lists for each volunteer subject.

Other experiments may have been documented in greater or lesser detail than described above, however, this experiment was cited to show the average method of operation for a psychochemical experiment.

## Field Test

Determining the effect of a psychochemical agent on the morale and efficiency of a military unit was the objective of testing that class of drugs from the inception of the volunteer program. Evidence of the purpose of psychochemical research was found in the report of the "First Psychochemical Conference," which was held in May 1954.[9] At that conference many of the leading psychochemical medical researchers presented the results of experiments they had conducted on their own and under Army contract. At the conclusion of the meeting one of their recommendations was "Field trials are now indicated. These should include the effectiveness of performance of soldiers subjected to psychochemicals in the execution of war games all the way from desk levels to field levels."

A similar recommendation was offered by the "Ad Hoc Study Group on Psychochemical Agents" in their 19 November 1955 report to the Office of the Assistant Secretary of Defense, R&D.[10] The group's report, known as the "Wolff Report," carried a recommendation that "The experiment, as outlined in detail in this report, be carried out with volunteer units as soon as practicable," and that "The potential and promise in the use of psychochemical agents in warfare be re-evaluated upon completion of small-unit experiments."

Thus, the preliminary studies conducted with animals and with individual volunteer subjects were preparatory to evaluation of military units, "field test," or "applied research." Field tests that were conducted away from the immediate area of Edgewood Arsenal will be discussed in the next chapter. The first reported applied research with any semblance of a military unit was reported at a February 1957 Medical Research Contractor's Conference on Psychochemical Agents. A military member of the Medical Research Laboratory staff reported that four volunteers were organized into an infantry team in order to test their ability to decontaminate themselves of a simulated chemical agent while under the influence of LSD. The test, which took place in 1956, was conducted on the Edgewood Arsenal Reservation. The four men were given an oral dose of LSD prior to the start of the test. While they were digging a foxhole an airplane passed overhead and sprayed a water solution which simulated a chemical agent attack. The task was to remove the solution from the exposed skin by using the approved decontamination procedures.[11] The principal finding reported was that the men performed all tasks as well after ingestion of LSD as they had without the effects of the drug. However, it was judged that their motivation had been affected and that more difficult mental tasks would better measure the incapacitating ability of LSD. Thus, more tests were planned for 1957.

In 1957 several additional field type tests were conducted in and around Edgewood Arsenal. The first of these tests involved the use of a NIKE missile unit's radar van at Aberdeen Proving Ground (an Army post located five miles from Edgewood Arsenal). Available records indicated that 16 volunteers received LSD prior to attempting to perform the tracking and recording operations associated with the employment of radar equipment.[13,14] Additional field type tests were conducted at Edgewood in December 1957. Those studies included: 20 enlisted men performing military drill (marching) under the influence of LSD to evaluate their ability and willingness to adhere to the discipline of close order drill; 12 volunteers were evaluated to determine their ability to don chemical protective masks and perform skin decontamination exercises similar to those held a year earlier; 8 men performed disassembly and assembly of the military rifle after having ingested LSD; another group of 28 volunteers were evaluated for their ability to concentrate on volleyball competition after LSD ingestion.[12]

## Physiological and Material Studies

In the early years of the volunteer program, the majority of volunteers were used in physiological studies and military clothing and equipment tests. For the most part, these tests did not involve the use of drugs; or in some cases very minute quantities of a chemical compound. An Information Paper prepared for volunteers in 1957 by the Office of the Chief Chemical Officer, Department of the Army, described the following type tests:[18] (1) "Evaluation of Chemical Warfare Equipment. Various designs of gas masks and protective hoods are worn for short periods to test the relative merits of each model. If the item leaks, the wearer experiences a slight eye irritation which is not even sufficient to produce tears. If this occurs, the volunteer leaves the test chamber immediately. The eye effects disappear within several minutes from the time of leaving the chamber. (2) Adaptation of Defensive Items to Natural Human Capacities. Certain items of protective clothing are worn under controlled conditions to determine their value to the soldier under varying conditions which might be encountered in the field. There will be little or no discomfort or fatigue."

Several examples of the non-drug related studies were cited in a special publication entitled, "Medical Research Volunteers - Peacetime Heroes."[15] For example, volunteers tested the serviceability of experimental chemical field alarms. To do this, volunteers were placed in a safe container such as a van in order to test an alarm (developed to alert troops of the presence of a chemical agent); the van was then moved to a contaminated area and the volunteer would attempt to determine the chemical concentration of the outside environment. Others tested such equipment as protective air locks for operational combat vehicles. The volunteer would dress in fully protective clothing and enter into the air lock (sealed chamber) from a simulated contaminated area, discard his outer garments as if they were contaminated, and then enter into the work area of the van. Thus, providing data on speed of operation and adaptability of the equipment to field usage. Volunteers also tested methods of feeding troops in a chemically contaminated atmosphere. Under simulated conditions, they tested equipment that could enable a military tactical unit to feed its soldiers while in a gassed area. Examples of physiological studies were: to have volunteers walk a treadmill in a variety of temperatures to determine the extent to which sweat would reduce the protective qualities of impregnated clothes; and volunteers would scale barriers while wearing a protective chemical mask to allow scientists to evaluate any restriction the mask caused to the volunteer's rate and volume of breathing. Hundreds of such tests were routinely conducted and constituted a major use of the volunteers. Statistical records indicated that between 1955 and 1963 11% of the available volunteer time was used in lethal agent experiments; 27% of the time was used in testing various incapacitating agents, 13% in physiological studies; and 49% in material studies.[16]

Another record reflected that medical volunteers were used a total of 240,442 hours during the period 1958-1962.[19] These hours were broken down according to experimental categories:

| | |
|---|---|
| 1. Incapacitating compounds | 29.9% |
| 2. Lethal compounds (anticholinesterases, cylinide) | 14.5% |
| 3. Riot control compounds | 14.2% |
| 4. Protective equipment and clothing (masks and climatic effects) | 13.2% |
| 5. Effects of drugs and environmental stress on human physiological mechanisms | 6.4% |
| 6. Development evaluation and test procedures (compounds in body fluids, stress conditions) | 12.5% |
| 7. Human factors tests (ability of volunteers to follow instructions) | 2.1% |
| 8. Other (visual studies, sleep deprivation, incapacitating compounds' effects on rifle team) | 7.2% |

## Quantity of Participation in Medical Research Volunteer Program

Several factors hindered determination of the exact number of volunteers that participated in the chemical warfare medical research program. Information was made available, through testimony of some witnesses as well as informal discussions with past and present Medical Laboratory employees, that some medical investigators exposed themselves (as well as other informal volunteers from the medical staff) to various chemical agents. For the most part, records of those exposures are not available.[7,21,22] This figure was estimated by the staff at the Biomedical Laboratory to be 115 different informal volunteers. No evidence was found to substantiate or refute that figure.

Another factor that may have affected accurate recording of the number of volunteers involved in drug experiments was the Medical Research Laboratory's policy concerning access to volunteer medical records. In February 1969 it was reported that approximately 300 volunteer medical records were missing from their normal place of storage.[24] It was apparent that for the first 14 years of volunteer work, the Medical Research Laboratory had liberal policies concerning access to and use of the experimental data on medical volunteers, to include their case records. Although those procedures were apparently strengthened after February 1969, there exists the possibility that some of the volunteer records were not recovered or that important data was removed from the records over a period of years. Finally, determining with certainty the quantity of volunteer participation over a 20-year period was hampered by conflicting reports. However, an approximation of the number of volunteers used by the Biomedical Laboratory (formally Medical Research Laboratories) was determined from reports and technical data made available during the research effort.

The first of those reports was prepared in 1958, three and one half years after the records indicated the volunteer program began at Edgewood Arsenal.[20] The publication contained data that 758 volunteers had served between May 1955 and June 1958. Four years later another special publication[19] reflected that as of June 1962, a total of 2,588 volunteers had served at Edgewood. Other data concerning the number of volunteer subjects used in experiments was found in an Information Paper published in 1964.[18] It was reported that at the end of 1963, 2,863 volunteers had been received at Edgewood's Medical Laboratory. The figures in that report were in conflict with both of the earlier reports; the variance between the figures on a yearly basis was as much as 27% in one year group.

An undated recruiting and selection booklet that apparently had been published in 1974[17] contained a chart titled, "Participation in Medical Research Volunteer Program." Although the exact figures were not presented, a bar graph display indicated that approximately 6,605 volunteers participated at Edgewood as of 30 June 1973. Again, there were differences in the figures found in this report and earlier reports. Finally, a notebook reportedly kept current over the years contained a fifth set of volunteer participation figures.[25] These figures totaled 6,983 volunteers with 308 of them being repeaters, or 6,675 different volunteer subjects from May 1955 through July 1975. These figures also differed from the other reports. In order to provide the best possible documented estimate of volunteer participants at Edgewood Arsenal, the yearly figures contained in the five different sources were averaged for the years they overlapped each other and the average figure was used.

The figures discussed so far include volunteer participants at Edgewood, not the volunteers in "field tests" at other military posts. Moreover, these figures represent the number of volunteers available for all types of experiments and not just those involved in drug or agent type experiments. The number of volunteers that actually received a drug or experimental chemical compound was even more difficult to determine exactly. Relatively little evidence regarding which volunteers received which drug was found. Volunteer case records maintained at the Biomedical Laboratory at Edgewood were, in many cases, incomplete, and, as mentioned, some records may have been lost. However, they represented the best available evidence of which volunteers received drugs and which did not.

Accordingly, selected data from those records was prepared in the form of a computer printout in January 1976.[26] That printout was used as the principal document in determining the number of volunteers used in drug tests. The approximate number of volunteer participants used at Edgewood's Medical Laboratory and the number of volunteers used in drug or chemical agent experiments as reflected in the available individual volunteer case record are indicated in Chart 1 at the end of this chapter. The chart also shows the percentage of the available volunteers that were used in drug/agent experiments during each of the 20 years of the program.

Irregularities

During the review of the records and reports concerning the conduct of the volunteer program at Edgewood Arsenal, several irregularities were disclosed. Although the errors did not appear to distract from the overall worth of the program, they are brought out in this report so that future errors of this or of a similar nature can be avoided.

As mentioned earlier in this chapter, some medical investigators conducted self-exposures and allowed other technical personnel to "informally" volunteer for drug/agent experiments. This practice, no matter how well controlled, and admirable, should be disallowed unless it is properly approved and the subjects receive the full benefit of the standard medical examination and a complete record of their exposure is maintained in the same manner as other subjects. Otherwise, proper inspection of the program as well as medical follow-up, when required, is impossible.

Paragraph 4 of Chief of Staff Memorandum 385 (CS:385) of 30 June 1953 stated: ". . . as a general rule volunteer subjects should be males under 35 years of age, with no physical or mental diseases."[2] This guidance was repeated in various other official publications, including CWL-SP 2-13, which reportedly was required reading for all volunteers.[20] No evidence was found to indicate that restrictions against the use of females or males of 35 or more years of age were revised prior to 1974. On the contrary, permission to use female volunteers in chemical warfare research was requested in November 1958 and disapproved based on the recommendation of The Army Surgeon General in December 1958.[28] Evidence was available to establish that the policy was violated both by the use of females and of males 35 years of age or older. In fact, in February 1959 the Deputy Commander of the Chemical Warfare Laboratories reported his discovery of a violation of the prohibition against the use of females as subjects in a chemical warfare experiment.[23] Additionally, the computer printout of volunteers used in drug/agent studies at Edgewood[26] reflected that two female subjects were used in a test of a chemical nerve agent in 1957. Furthermore, informal discussions with Biomedical Laboratory personnel indicated that several other females were used in non-drug related experiments conducted at Edgewood.

A review of an Edgewood Arsenal volunteer participation notebook[25] and volunteer work sheets for 1960 and 1961[27] revealed male subjects age 35 or older were used on at least 31 occasions between 1960 and 1965 in violation of Army policy.

Finally, testimony of witnesses, informal discussions, and a review of some volunteers' official medical records disclosed that no mention of the volunteers' participation or the drug/agent received was reported in individual official medical records. Since the majority of compounds tested in humans were experimental, it seemed logical that not all the hazards or long range effects that could be caused by the compounds were known to the medical investigator at the time of the experiment. Thus, data as to the chemistry of the agent, amount used, and a point of contact where specific details were available would appear to be the minimum information required to be entered in the individual's official medical records.

The Surgeon General of the Army is aware of this problem, and on 8 September 1975 testified before Congress that "In addition, action has been taken to insure that any participation in volunteer studies under the sponsorship of Fort Detrick or Edgewood Arsenal will be carefully documented in individual medical records."[29]

## CHART I

## VOLUNTEERS USED IN CHEMICAL AGENT EXPERIMENTS AT EDGEWOOD ARSENAL

| YEAR | VOLUNTEER AVAILABLE* | NO. OF VOLUNTEERS USED IN AGENT TESTS** | % USAGE IN AGENT TESTS |
|---|---|---|---|
| 1955 | 142 | 91 | 64 |
| 1956 | 103 | 57 | 55 |
| 1957 | 208 | 144 | 51 |
| 1958 | 382 | 212 | 55 |
| 1959 | 414 | 179 | 43 |
| 1960 | 534 | 38 | 7 |
| 1961 | 472 | 156 | 33 |
| 1962 | 396 | 130 | 33 |
| 1963 | 348 | 169 | 43 |
| 1964 | 474 | 290 | 61 |
| 1965 | 480 | 347 | 72 |
| 1966 | 400 | 243 | 61 |
| 1967 | 470 | 245 | 52 |
| 1968 | 407 | 208 | 51 |
| 1969 | 406 | 184 | 45 |
| 1970 | 312 | 161 | 52 |
| 1971 | 306 | 158 | 52 |
| 1972 | 271 | 159 | 59 |
| 1973 | 186 | 130 | 70 |
| 1974 | 103 | 70 | 68 |
| 1975 | 106 | 54 | 51 |
| | 6,992*** | Total 3,425 | 20 Yr Avg 49 |

*Average of five different reports.

**Extract from case record at Biomedical Laboratory, Edgewood Arsenal.

***Does not include an estimated 115 volunteers from the Medical Laboratory over the 20-year period.

## FOOTNOTES

## CHAPTER VII

1. History of Edgewood Arsenal, published in 1965.

2. Chief of Staff, Army, Memorandum for Chief Chemical Officer and The Surgeon General, subject: Use of Volunteers in Research, dated 30 June 1953 (CS:385).

3. Fact Sheet, subject: The Benzilates Status of Activities, dated 3 October 1960.

4. Report on Cost of Incapacitating Agent Program at Edgewood Arsenal 1950-1975 (TAB D), dated 3 September 1975.

5. U.S. House of Representatives Committee on Science and Astronautics Hearings of 22 June 1959.

6. Quarterly Progress Report - Research Plan, 12,248, dated 30 June 1972, subject: Investigation of Central Action of EA 3834 and Other Psychotropic Agents Use of Pupillometry.

7. Testimony of COL (Ret) Joseph R. Blair, MD, Director of the Biomedical Laboratory, 1963-1974.

8. U.S. Army Chemical R&D Laboratory TP 3226, "The Assessment of EA 1729 and EA 3528 by the Inhalation Route," dated July 1964.

9. CCRL Special Publication (MLSR Nr. 71), First Psychochemical Conference of 12 May 1954, published September 1955.

10. Report of the Ad Hoc Study Group on Psychochemical Agents, for the Office of the Assistant Secretary of Defense, R&D (Wolff Report), dated 19 November 1955.

11. Memorandum from the Chief, Clinical Research Branch, to the Fort Benning Advance Course, reference LSD test, undated.

12. Sim Fact Sheet #1.

13. Letter, Chief of Research and Development to Dr. Harold G. Wolff, New York Hospital, subject: Human Volunteer Tests with K Agents, dated January 1957.

14. CRDL TP 3074, "Clinical Investigation of EA 1729," dated June 1961.

15. CRDL SP 2-44, "Medical Research Volunteer Peacetime Heroes," dated August 1961.

16. Chief Chemical Officer, Department of the Army, Letter of 11 July 1957, subject: Medical Research Volunteer Program, Inclosure 3, Medical Research Volunteer Program Handout.

17. Booklet entitled, "Recruitment and Selection of Medical Volunteers."

18. Volunteer Program Information Paper, "Human Investigation Facility," dated 14 February 1964.

19. CRDL SP 2-51, "Evolution of the U.S. Army Chemical Research and Development Laboratories Medical Research Volunteer Program," published November 1962.

20. U.S. Army Chemical Warfare Laboratories report on the Medical Research Volunteer Program, CWL-SP-2-13, dated June 1958.

21. Testimony of Colonel Ketchum.

22. Testimony of Dr. Sim in 1959 and 1975 to Congress.

23. Disposition Form, subject: Use of Volunteers for EA 1779 Tests, dated 10 February 1959.

24. Memorandum for Record and SOP (Clinical Research Department), subject: Record and Document Control, dated 13 February 1969.

25. Edgewood Arsenal Volunteer Participation notebook, undated.

26. Computer printout of Volunteers' Participation in Drug Related Studies at Edgewood Arsenal, May 1955 to July 1975.

27. Volunteer Work Sheets for July 1960 and January-May 1961 found in folder 1303 at Biomedical Laboratory.

28. Letter, subject: Use of Human Volunteers in CW Research, from Edgewood Arsenal to Commander, U.S. Army Chemical Corps R&D Command, dated 4 November 1958. First Indorsement from The Surgeon General, dated 8 December 1958. Third Indorsement, same subject, dated 31 December 1958.

29. Prepared statement by LTG Richard R. Taylor, MD, The Surgeon General, Department of the Army, before the Subcommittee on Investigations of the Armed Services Committee, House of Representatives, First Session, 94th Congress, 8 September 1975.

# CHAPTER VIII

## FIELD TESTING OF LSD

### General

The purpose of this chapter is to discuss the "field testing" phase of the approved basic research plan to test the effects of psychochemical agents on small military units and military operations. It will include a discussion of tests conducted at Fort Bragg, NC, Fort McClellan, AL, Fort Benning, GA, and Dugway Proving Ground, UT.

The individual test phase of the research plan was conducted primarily at the Army Chemical Center (Edgewood Arsenal) and was directed at the effects of psychochemical agents on the nervous and mental functions of individuals, and also to evaluate prophylactic and therapeutic agents to combat the effects. Since one of the stated purposes of the research was to estimate the actual vulnerability of military personnel to psychochemical agents through the use of operational exercises, it was necessary that the experimentation be directed to actual military units and military tasks.

As discussed earlier, the "Wolff Report" served as an additional persuasive justification for the eventual approval of the proposed research plan to use human volunteers in testing the psychochemical agents. In addition, the report provided emphasis on the need to test small military units. The following paragraphs from the "Wolff Report" are quoted to illustrate the degree of importance placed on the use of military units by the Study Group and subsequently reflected in the field testing phase:[1]

> There is much experimental data on the effect of LSD 25 on individual humans under laboratory and civilian circumstances, but, in the opinion of the Study Group, there is not yet sufficient information about the effects of very large doses of LSD 25 on humans or about its effect on groups of people, and especially upon organized and disciplined groups of people. Based upon our present knowledge of the effects of the drug, we can make the following statements:
>
> (1) If LSD 25 is used against heterogeneous, undisciplined and uninformed groups of people and if it is administered by surprise, it is possible that the agent will be effective in producing panic and disorganization.
>
> (2) When LSD 25 is used against homogeneous, well-disciplined, properly led and previously informed groups of people who are forewarned of its administration and likely effects, the

> effectiveness of the agent in producing panic and disorganization is not known. . . . The promise offered in this field can be determined only by assaying the effect of psychochemical agents on military units. If LSD 25, used as outlined in the experiment, should fail to produce disorganizing and disrupting effect on the military unit, it would be evident that there is no military promise in this field. However, if the use of these agents should, under the specified conditions, produce serious disruption in the ability of the unit to carry out its missions, then it could be reasonably stated that these agents offer great promise for use in military operations.

To determine the answers to the problem posed, the Study Group prepared and recommended a detailed plan for demonstration of the military effectiveness of LSD-25 when used on small bodies of troops. The detailed plan specified that a military group of the general size of an Army squad or the aircraft flight crew of a large bomber be used, and further recommended that the group have the following characteristics:[1]

> It should have existed as a unit for some time prior to the experiment.
>
> Its members should be thoroughly familiar with each other and with their leader.
>
> The group should be recognized as having high morale and strong cohesiveness.
>
> The caliber of the group and its membership, however, should not be so outstanding as to make it markedly different from any other good unit of similar type in its branch of the service. . . .

Additionally, the Study Group stressed that pre-test studies be made on the members, to include medical, psychiatric, and psychological examinations. The report continued that: "No man will be excluded from the previously chosen group because of medical or psychiatric findings unless in the opinion of the medical evaluators the administration of LSD to such a man would be seriously dangerous to his physical or mental health. The total data shall be used to aid in understanding the results of the experiment."[1]

## Authority

A proposed plan, "Additional Use of Volunteers in CW Research," was prepared originally by the Chief, Clinical Research Division, Edgewood Arsenal, in

September 1955, and subsequently submitted through channels by his successor. The proposal was held for a period and then recomposed by the Deputy Chief, Research Division, Chemical Research and Development Command, prior to forwarding to Chief Chemical Officer for final staffing.[2] The plan was reviewed by The Surgeon General, and on 26 April 1956 the Chief Chemical Officer forwarded the plan, in accordance with Chief of Staff Memorandum 385, to the Secretary of the Army for approval. However, by a memorandum to the Chief of Staff, U.S. Army, dated 17 May 1956, the Director of Research and Development approved the plan.[3] There was no evidence that the Secretary of the Army reviewed or approved the plan.

The research plan included, among other goals, the following:

> (1) Studies of the effect of psychochemical agents on the nervous and mental functions of man.
>
> . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
>
> (b) By the use of operational exercises, estimates of the actual vulnerability of military personnel to psychochemical agents will be made. The kind of tests contemplated include: command post exercises, logistics exercises, performance of small squads as teams in complex group activities such as bridging a small stream, the operation of a fire direction center, a performance in a link trainer, operation of a filter center, etc. The culminating exercise will be an infantry squad performing typical field operations over varied terrain.[3]

Before proceeding with the progress of the field testing phase, an interesting point came to light while reviewing the proposed research plans; a point which appears to further illustrate the impact of the "Wolff Report" on chemical agent research. The copy of the proposed plan which was approved by the Director of Research and Development and inclosed with his memorandum to the Chief of Staff[3] differed from the proposed plan originally submitted by the Chemical Research and Development Command. Specifically, the following sentence was added to the subparagraph (b) of the study requirements: "The culminating exercise will be an infantry squad performing typical field operations over varied terrain." A search of the file failed to disclose who added the extra task, although it apparently occurred after the proposal left the Chemical R&D Command.

In reviewing the "Wolff Report," particularly the detailed plan for demonstration of the military effectiveness of LSD-25 when used on small bodies of troops, their proposed infantry task was quite similar.[1] It is logical to assume that since the original proposal was prepared well before the

"Wolff Report" was published, that the extra task probably was added in the Office of the Chief Chemical Officer, where the "Wolff Report" was then available. Since it was not a significant change to the plan, apparently no special note was made. However, the fact that it was added provides some indication of the attention given to the "Wolff Report."

## Field Testing - Fort Bragg, NC

The first of the field tests was conducted at Fort Bragg, NC, and involved several units of the XVIII Airborne Corps Artillery.

It could not be determined with certainty who initiated the request for the test nor why the XVIII Airborne Corps was the selected major unit. However, several documents were located which provided some insight into the sequence of events that led to the selection of the XVIII Airborne Corps. A copy of a message, dated 28 June 1958, from the CG, CONARC, to the CG, US 4th Army (with information copies to CG, USA Air Defense Center, Fort Bliss, Office of the Chief Chemical Officer (OCCMLO), Wash., DC, and CO, USA CWL, ACC, MD), made reference to a letter, CMLPD-CE, OCCMLO, 7 February 1958, subject: Request for Authority to Conduct Test, with 2 Inclosures.[4] The cited reference indicated that the Chief Chemical Officer had requested use of personnel from a NIKE Missile Battalion as participants in a test of EA 1729 (LSD). A 3d Indorsement to this letter, headquarters unknown, requested the Commanding General, U.S. Army Air Defense Center, to consider the capability to participate in the test with the cited AAA Battalion or other SAM (surface-to-air missile) unit. A second reference cited in the message was a letter, AKBAAC-PAPA, HQ, U.S. Army Air Defense Center, 5 June 1958, subject: Request for Conduct of Test by Chemical Corps (U), and 1st Indorsement, 13 June 1958, with 2 Inclosures. Although the contents of this letter could not be determined, it appeared from subsequent events that the proposed AAA Battalion could not be used. The body of the message contained a request for information concerning the availability of any four trained NIKE launching or fire control sections. The message also exhibited a sense of urgency in that it mentioned a starting target date of 1 August 1958. No further information concerning this correspondence or the request for a NIKE missile unit participation was found.

In reviewing a draft copy of a letter, Headquarters, XVIII Airborne Corps Artillery, undated, subject: B.W. Laboratories - Fort Bragg Tests,[5] there was reference to a TWX, Headquarters, Third U.S. Army, AVCML 7-1, to Commanding General (CG), XVIII Airborne Corps, dated 17 July 1958, and a letter, Headquarters, XVIII Airborne Corps and Fort Bragg, subject as above, dated 13 August 1958. It appeared that the original February 1958 request from the Office of the Chief Chemical Officer to the CG, CONARC, was for personnel from a specific AAA Battalion (Missile NIKE) to take part in the test program. (This type unit may have been requested by the Chemical Warfare Laboratory personnel since they had conducted individual tests in 1957 on personnel assigned to a NIKE site (radar van operation test).)[28] When as late as 27 June 1958 no response had been received, it was assumed that at this time the Chief Chemical Officer again contacted the CG, CONARC, who then contacted the Commanding General, Third U.S. Army, who, in turn, sent a message, dated 17 July 1958, to the Commanding General, XVIII Airborne Corps, which presumably either requested or directed the Airborne Corps to assist in the test program.[5]

In a report of a meeting of the Medical Committee, U.S. Army Chemical Corps Advisory Council, 3-4 November 1958, Fort Detrick and Army Chemical Center, MD, it was reported that: "A third test on which the Chief, Clinical Investigation Division, reported involved the use of a film during which an evaluation of the agent was given, not by the Chemical Corps but by a representative of the service testing the agent. Only during the medical phase of the operation did the Chemical Corps participate in this test. The test was conducted at Fort Bragg at the instance of CONARC. The subjects were from the 18th Airborne Corps Artillery."[6] Again, in a Chemical Research and Development Laboratories Technical Report, CRDLR 3074, Clinical Investigation of EA 1729 (U), dated June 1961, it was reported that: "After enough experiments in individual and small groups of volunteers had been carried out to ascertain that large group studies were feasible, arrangements were made by CG, CONARC, to conduct a test at Fort Bragg, NC, in September 1958. Chemical Corps personnel supplied the necessary medical support for all test operations, but operational evaluation of the tests was made by members of the XVIII Airborne Corps."[7]

From the few documents relating to this phase of the test program, it appeared that the Chemical Warfare Laboratories had conducted sufficient individual tests and were preparing for the testing of small units. The Chemical Warfare Laboratory, through its command channels, apparently initiated the basic request for unit testing, and when the Air Defense Command was unable, for one reason or another, to take part in the field test, the request then moved to CONARC and eventually to the XVIII Airborne Corps, a unique organization. No evidence was found to indicate that any of the headquarters concerned disagreed with the proposed conduct of the field testing of EA 1729.

Prior to commencement of the Fort Bragg field test, the Chemical Warfare Laboratories, Army Chemical Center, sent two of their personnel to Fort Bragg, and based on their observations and discussions with personnel of the XVIII Airborne Corps Artillery, recommendations were made for the

Chemical Warfare Laboratory (CWL)-Fort Bragg tests to the XVIII Airborne Corps Chemical Officer. Their recommendations, which were contained in a disposition form, subject: CWL-Fort Bragg Test, dated 31 July 1958, listed the specific units to be tested and also provided a proposed calendar of events.[8]

The results of the tests involving personnel of the XVIII Airborne Corps Artillery were well documented: an after action report, in draft form, prepared by Headquarters, XVIII Airborne Corps Artillery;[5] a story plan for the Fort Bragg film;[9] a disposition form, dated 23 September 1958, from the Chief, Chemical Research Division, to the Deputy Director and Director, Medical Research, subject: Brief Summary of Work on Fort Bragg Tests, covering the period from 2 September-13 September 1958;[10] and a Chemical Research and Development Laboratories Technical Report (CRDLR) 3074, subject: Clinical Investigations of EA 1729 (U), dated June 1961. The reports generally were consistent in their overall evaluations of the effect of LSD-25 on small military units.

For the purpose of the record, a compendium of the cited test results references is presented below.

XVIII Airborne Corps Artillery

a. Teams selected from the tests were:

(1) Meteorological Sections from 2d Obsn Battalion, 26th Artillery and 2d Missile Battalion (HJ), 42d Artillery.

(2) Survey teams from 2d Obsn Battalion, 26th Artillery and 2d Missile Battalion (HJ), 42d Artillery.

(3) Two 40mm AW Gun Crews from 3d AW Battalion, 62d Artillery.

(4) Fire Direction Team from 1st How Bn, 83d Artillery and 3d How Bn, 16th Artillery.

b. All tests were photographed using both silent and sound movie cameras to record actual reactions during the tests.

c. All personnel who took part in the test were volunteers and were screened thoroughly, both physically and mentally. Of the 70 men who volunteered to compose the teams, 11 were rejected for either psychiatric or medical reasons. The crews selected represented above average, skilled Army units with exceptional morale. All personnel were completely informed as to probable effects of the agent and probable duration of the effects.

The XVIII Airborne Corps Artillery After Action Report added the following statement: "This screening and orientation contributed materially to the ability of the teams to produce any results at all."[5]

d. Test protocol. The total dose of 150 micrograms of EA 1729 administered to the volunteers was selected on the basis of previous clinical experience as a dose which would (1) produce measurable effects that would endure for the period of the test; (2) permit the degree of physical activity necessary; and (3) not be so severe as to result in a termination of the test before missions were accomplished.[7] A breakout of the agent exposure of the 59 men tested was as follows:

47 volunteers received a single dose = 47 doses
8 volunteers received two doses = 16 doses
4 volunteers received three doses = 12 doses
59 volunteers received a total of 75 doses

Complete recovery was experienced by all personnel within 36 hours after receiving the agent.

e. Test results.[7]

(1) Meteorological Section. The mission of this section was to furnish necessary weather data that would affect artillery projectiles or rockets in flight and would furnish wind aloft data for prediction of fallout after an atomic burst. The sections were assigned the mission of making weather balloon releases at intervals of dose + 10 min; dose + 1 hour; and dose + 2 hours. A completed message was prepared after the first weather balloon, but the section could not produce anything for the next two balloons.

(2) Survey Section. The mission of this section was to furnish survey control data by artillery units to locate firing positions and targets. Two survey sections were given data for a survey control point and the mission of extending this control to another area; a mission which normally would be accomplished in 2 1/2 hours. The drugged team required 5 hours to perform the task and the accuracy was within allowable tolerances only because the team recorder was not drugged and was able to recheck all angles and taped distances. When the test was repeated with all team members drugged, the team required almost 4 hours to complete the mission and the accuracy was not within tolerable limits.

(3) Fire Direction Team. The mission of this section was to control battery or battalion firing by converting information furnished by an observer into commands for guns to fire; to convert without adjustment data furnished by survey and meteorological sections into commands

to deliver fire on targets when no observer is available. An hour after receiving EA 1729, the drugged team was much slower in processing fire commands, and although they were able to perform the necessary computations for delivering area-type fire on target with acceptable results, they could not fire precision type missions with any degree of accuracy because of the inability to concentrate.

(4) 40mm Anti-Aircraft Automatic Weapons Gun Section. The mission of this section was to provide air defense for forward combat arms and to attack and destroy hostile targets on land or water, as required. Two 40mm AA sections were emplaced on a ridge affording field of fire in all directions; movie cameras were mounted parallel with gun tubes and an L-19 aircraft was used as the target. Before administration of the drug, the target tracking was smooth and continuous, however, after taking the drug, the tracking efforts were jerky and uncoordinated. A study of the film indicated that although there were some simulated hits, they were obtained more by accident than by design.

The overall conclusions of the test were: (1) the agent is an effective weapon for use against units for the purpose of rendering these units ineffective for periods of from 6 to 24 hours; and (2) that units subjected to this agent would be incapable of fulfilling their mission. Although no actual firing was conducted using subjects who had been given the drug, due to the safety requirement involved, results of the teams that were used indicated that the confusion existing would be the same in the gun sections.

## Medical Results

The Chemical Warfare Laboratories (CWL) project officer, in his brief summary report, pointed out that:

> In general medical problems have been minimal on this test. In the first week of tests one person of the Meteorological section became apprehensive to the point where he was given 100 milligrams of thorazine orally. An interesting observation . . . the first Survey Team who had received the drug the first week, all of them completed the survey with little difficulty . . . after removal of one man who passed out in the first thirty minutes of the first test complaining of numbness and tingling of his hands and inability to move his hands and legs. He required no medication and. . . . However, in the second week three of the group who had previously received the drug developed what might be classified as hysterical reactions. In one, there was marked anxiety

> reaction. . . . He was reassured and required no medication. Another man also had difficulty in the vehicle returning from the test and became quite apprehensive. The third man had some difficulty breathing and on reassurance by the medical personnel quieted down. In two of these instances they were people who had carried out their tasks very well the previous week and it was not suspected that such a reaction would occur. In the survey team, on the 13th of September, one man developed a paranoid reaction. He became quite withdrawn, would not communicate with other members of his team and refused to eat or drink, saying the food was probably contaminated with the material. Over the period of 12 hours he gradually improved and the following morning was improved to the extent that he was communicating quite freely with medical personnel.
>
> It might be stated that there have been no instances in which there was not a noticeable change of behavior in any of the personnel who received the drug. . . . In general, performance was not improved as a result of having experienced the drug reaction previously.[10]

## Compliance With Chief of Staff Memorandum 385

The information available indicated that the requirements of the volunteer program, i.e., voluntary and informed consent, were met, however, copies of the individual volunteer statements and/or test records were not available.

Other provisions of the "Wilson Memorandum" and Chief of Staff Memorandum 385 were not as scrupulously followed. A former commander of the Chemical Corps Research and Development Command was interviewed concerning his knowledge of the volunteer program and the use of LSD in the research program. He related that he had volunteered to take part in the chemical agent research program; he had taken the regular physical and psychiatric examinations to make sure he was okay; he knew he was going to get the drug LSD at some point, but did not know exactly when. "I agreed that I would take the drug, but when it was administered would be up to the medical investigator." In response to a question as to whether he had ever been administered a hallucinogenic drug without first being made aware of the fact, he responded: "Yes." He related that it took place at Fort Bragg when he was there observing a test being conducted with members of the XVIII Airborne Corps Artillery: "I was there to observe what was going on and also to brief the CG, XVIII Airborne Corps. I went to the site with CWL project officer and a major; it was early and it was cold. I was asked if I wanted some hot coffee, which I did. I was given the coffee and apparently it had

LSD in it; they told me later, it had a dose of 200 micrograms of LSD." He continued by relating that he had to brief the Corps Commander, who was a very rough customer. When asked if he would have voluntarily taken LSD at that time, he responded in the negative.[11]

In this instance, the individual volunteered for the program; received a very thorough briefing on LSD; knew the drug that he was going to be given, but did not know when it would be given. Several months later, while at Fort Bragg to observe the field testing of LSD and to brief the Commanding General, XVIII Airborne Corps, he was given a dose of LSD, without his knowledge or specific consent. In fact, he stated that he would not have voluntarily taken the drug at that time. If this was not an actual violation of Chief of Staff Memorandum 385 as it related to voluntary and informed consent, then, as a minimum, it constituted an overly broad interpretation of voluntary consent.

The CWL project officer, in a disposition form to the Director of Medical Research, subject: Fort Bragg Tests,[12] related other aspects that raise serious questions as to how closely the intent of Chief of Staff Memorandum 385 was followed. One of the basic principles cited in Chief of Staff Memorandum 385 which must be observed in order to satisfy moral, ethical, and legal concepts was: "During the course of the experiment the scientist in charge must be prepared to terminate the experiment at any stage, if he has probable cause to believe in the exercise of the good faith, superior skill and careful judgment required of him that a continuation of the experiment is likely to result in injury, disability, or death to the experimental subject."[13] In that disposition form the project officer wrote: "There have been statements that we can terminate a test after it has started, implying that we have antidotal compounds for 1729. . . . We do not have such a compound. At best all we can do is attenuate the acute reaction, not prevent nor terminate it."[12] From this it appeared that one of the basic conditions designed to safeguard the well-being of the soldier volunteer was not followed. While it may be argued that LSD was determined not to be a lethal agent, the fact that it was unpredictable and in an experimental category would appear to require strict adherence to all of the conditions set forth in Chief of Staff Memorandum 385.

## U.S. Army Special Warfare School, Fort Bragg Tests

While the XVIII Airborne Corps Artillery units were undergoing field tests of LSD-25, the Combat Development Test and Evaluation Officer, Special Warfare School, Fort Bragg, was directed to observe the ongoing tests to determine whether that office would be interested in pursuing the use of LSD from the standpoint of its application to unconventional warfare tactics. Initially, two officers from the Special Warfare School and one from the

7th Special Forces Group began to develop a series of evaluations with respect to unconventional warfare operations involving the use of LSD-25. The three officers volunteered to take the drug to gain firsthand knowledge of its effects. Each was given a medical and psychiatric examination and then a complete briefing on the drug and its probable effects. A series of test situations were developed for Special Forces application.[15]

The following synopsis and conclusions of the tests were obtained from a Report of Tests of Chemical Agent K-EA-1729 (U) prepared by the Special Warfare School.[16] During the period 29, 30 September and 1 October 1958 two tests, a Guard Post Exercise and a Cover Story Interrogation Exercise, were conducted using chemical agent EA 1729 on approximately 20 members of the 7th Special Forces (SF) Group.

Test Results

a. Guard Post Exercise. Eight members of the 7th Special Forces Group were assigned guard posts and given a dose of LSD. They were instructed to deny entry to an area by anyone not having a special pass. Penetration of the guard post was accomplished easily.

b. Cover Story Interrogation. Twelve members of the 7th Special Forces Group were given the agent and then subjected to intensive interrogation by trained military intelligence personnel to determine if the individuals could retain their cover story, to include identification, while under the influence of the drug. It was concluded that an interrogator of limited experience could compel a subject to compromise himself and to sign documents which could place him in jeopardy; and that with a higher dose of the agent, a state of fear and anxiety could be induced where the subject could be compelled to trade his cooperation for a guarantee of return to normalcy.

In the Report of Tests of Chemical Agent K-EA-1729 it was mentioned that an additional test was proposed; a test which would involve a completely realistic guard situation, at night, with surveillance of the subject being maintained surreptitiously. It was also proposed that the personnel used would be those who had been previously evaluated (physically and mentally) and that the agent (LSD) would be administered clandestinely. It was then recommended that "These tests be conducted, if reasonably convenient, but that further undue efforts not be expended for this particular project. It is felt that the results of such a test, added to what is now known of the effects of the drug, would not materially change the conclusions which have already been reached with regard to the potential use of the agent in Special Forces operations."[16] Had this proposal been accomplished, it would have resulted in at least two violations of Chief of Staff Memorandum 385; the first being the clandestine administration of the drug—violating the informed voluntary consent provision and thus negating the ability to withdraw at any time; and secondly the value and necessity of the experiment. The first violation was discussed earlier. The other violation mentioned concerns the following principle of Chief of Staff Memorandum 385: "The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study and not random and unnecessary in nature."[13] Although no record was found which would indicate that the proposal was carried out, the fact that it was made by a responsible individual casts a cloud over the degree of integrity practiced in complying with the principles of Chief of Staff Memorandum 385. Research records for the Special Forces personnel who participated in the field testing of LSD were not available for review. Information as to protocol procedures during the tests was obtained from the project officer, who stated: "Each of them was informed of the fact that this was a test of a drug; I don't know if they were told the name or the fact it was hallucinogenic. I do know that each signed a consent statement and each was given the same examinations before undergoing the tests. . . . We concluded the tests and reactions were inconclusive, . . . there was so much variance in the reaction that we could not use it with any degree of dependability, and at that point the project was dropped and because of the nature of some of the reactions of the individuals to the drug, particularly under interrogation by professional military intelligence personnel, I recommended, and my boss agreed, to destroy all of the individual records of the evaluations because things occurred during the interrogation situation, while they were under the drug, that could have been taken out of context later and used against them in an adverse manner, and so to protect the individuals who were involuntarily reacting to these situations, I destroyed the individual records involved."[15]

## Field Testing - Fort McClellan, AL

The second series of the field testing of EA 1729 was conducted at the U.S. Army Chemical Corps School, Fort McClellan, AL.

### Purpose

The purpose of this series of tests probably was best expressed in a statement contained in the U.S. Army Chemical Research and Development Laboratories' Technical Report (CRDLR) 3074, dated June 1961, subject: Clinical Investigation of EA 1729:[7]

> 1. Demonstration of Effects of EA 1729 to U.S. Army Chemical Corps School Personnel. The Chief Chemical Officer desires all officers assigned to the Chemical Corps to be thoroughly familiar with the current standard agents that the Corps has developed and those experimental or research compounds that show the most promise of ultimate development into effective agent or weapons systems. For this reason, several demonstrations of the effects of EA 1729 were conducted at the U.S. Army Chemical Corps School, Fort McClellan, Alabama, in which students and members of the staff and faculty participated. It was felt that actually experiencing the effects of EA 1729 would enable members of the Advanced Class to discuss more intelligently the potential of the compound, recognize its symptoms, and that additional clinical data could be gathered upon which to base a determination of the value of EA 1729.

The above statement, as written, appears to indicate a subtle pressure, intended or not, placed on all Chemical Corps officers at the U.S. Army Chemical Corps School to volunteer for the program, if for no other reason than to be better qualified in their profession. The use of the term "demonstration" in conjunction with the statement appeared to run counter to the basic principles governing the use of volunteers in research, notably:

> b. The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study and not random and unnecessary in nature.
>
> c. The number of volunteers used shall be kept at a minimum consistent with item b above.[13]

The statement attributed to the Chief Chemical Officer also appeared to establish or reiterate the following priority of results expected from the demonstrations:

a. 1st Priority. Enable members of the Advanced Class to discuss more intelligently the potential of the compound.

b. 2d Priority. Recognize its symptoms.

c. 3d Priority. Additional clinical data could be gathered upon which to base a determination of the value of the compound.

## Authorization

There were no records located which specifically addressed a proposal, recommendation, or authorization to expand the field testing of LSD to include demonstrations or practical exercises for the Chemical Corps Advanced Officers Classes. Thus, it could not be determined whether the proposal to administer LSD to students and faculty at the Chemical Corps School originated at the School, the Army Chemical Center, or the Office of the Chief Chemical Officer. Although problems of personnel changes, reorganizations, records retirement and destruction were prevalent throughout the research effort, the absence of files and records was most pronounced on events concerning the role of the Army Chemical Corps School in LSD testing.

In addition to the above problems, in 1974 the Army Chemical School at Fort McClellan, AL, was closed and then relocated to Aberdeen Proving Ground, MD, where it was changed from a separate Branch School to a department within the U.S. Army Ordnance School. Concomitant with the Chemical School's relocation and redesignation, there was a significant decrease in personnel and facilities. This series of changes probably resulted in many documents being retired or destroyed prematurely, misfiled, or misdirected during the transfer of assets to the new location. However, other documents available provided some insight into the question of authorization. At a meeting of the Medical Committee of the U.S. Army Chemical Corps Advisory Council on 15-16 June 1959, at Fort Detrick and the Army Chemical Center, MD, a film was shown of the Fort Bragg tests with EA 1729. The Chief, Clinical Investigation Division, Medical Research Laboratories, indicated to the council that this test left much to be desired as it was not sufficiently objective.[29] Prior to this, there was a meeting of the Protective Committee, U.S. Army Chemical Corps Advisory Council, on 16-18 March 1959, at Fort McClellan, AL, at which time the Fort Bragg film was shown. Personnel from the School were in attendance.[30]

Lacking adequate data to determine the actual sequence of events leading up to the tests at the Chemical Corps School, we can only assume what probably occurred. Based on the small size of the Chemical Corps and the close interrelationships among key personnel at the Army Chemical Center, Chemical School, and Office of the Chief Chemical Officer, it appeared that the "demonstration" of the effects of LSD on students and faculty probably was considered a routine action and not necessarily the result of a specific proposal, request, or recommendation. Suffice it to say, no record of any objections to this phase of field testing was found.

## Chemical Corps School Tests

The first indication of testing with psychochemical drugs at the Chemical Corps School, Fort McClellan, AL, was noted in a Chief Chemical Officer letter to the CG, USCONARC, dated 25 August 1959. The letter made reference to a test in which LSD-25 was administered to 30 students of the Chemical Corps Advanced Class during May 1959. It also referred to a report of that test, dated 21 July 1959.[38] No documents relating to this test or to the report of 21 July 1959 were found. In fact, this was the only reference to the conduct of such a test. However, additional corroboration that a test was conducted in May 1959 was evidenced by the presence of individual medical records retained by the Biomedical Laboratory, Edgewood Arsenal. These records indicated that LSD-25 was administered to personnel at the Chemical School in May 1959.[48]

The next instance of LSD testing at the Chemical Corps School was determined from several rosters which indicated that a series of tests involving LSD were conducted at Fort McClellan on 28, 29, and 30 October 1959.[22] Although records concerning volunteer statements, briefings, or medical and psychiatric examinations could not be found, information obtained from interviews and other documents indicated that: students, both officer and enlisted, and faculty members volunteered for the program; they were briefed thoroughly on the specific compounds or agents to be used; and they received medical and psychiatric examinations. Information available indicated that the subjects of these tests were properly informed as required by DA policy. However, there was evidence that the subjects may not have freely volunteered for the tests in all cases. Testimony and documents apparently prepared after the 1959 tests indicated that indirect coercion may have been used.[7,21,23,24,32] It appeared that students and faculty may have been influenced to volunteer as a result of subtle pressures being applied, such as: studying the effects of LSD by taking it was part of the course work; taking part and knowing, first-hand, the effects of LSD would enhance the professional ability of the officer; and conversely, failure to volunteer probably would result in a lower evaluation or opinion by peers and superiors. Additionally, a psychiatrist assigned to Fort McClellan from 1959 to 1961 stated that some personnel who declined to volunteer were sent to him to determine the reason for their not volunteering. He inferred that this was a form of pressure used to induce volunteer participation.[24]

However, a different viewpoint of the voluntariness of the Chemical Corps School participants was obtained during an interview of a retired senior Chemical Corps officer who had volunteered to take part in the research program involving psychochemical testing during the spring of 1959. He discussed his knowledge and recollection of the tests and opined that since these were Chemical Corps officers, they would have volunteered for the program because it was a big opportunity to take part in such a program; it would make them feel more professionally prepared; and since they would have viewed films made earlier, but not made available for public viewing, they would have had the best knowledge of the agent's effects and thus be more inclined to volunteer.[21]

The rosters obtained for the three tests conducted during October 1959 indicated that 79 personnel were tested.[22] The individual dosage and the number of times the drug was administered was not determined. The only official publication located concerning the tests at Fort McClellan was found in CRDLR 3074, Clinical Investigation of EA 1729, which provided the following information: "In these demonstrations, doses from 100 to 150 micrograms per man were administered orally to the participants, and then the individuals engaged in such activities as map exercises, target analysis, arithmetic problems, bridge and black jack games. Some staff and faculty personnel attempted to give platform presentations and to conduct seminar-type discussions." A chart accompanying this report reflected that 68 subjects had participated in the map exercise.[7] Another document titled, "Field Training Tests," which apparently was used as a source document for a chart or vu-graph transparency, indicated that there were two series of tests at Fort McClellan, the first during October 1959, which involved 79 personnel, and the second in November 1960, which involved 80 personnel.[31]

Information was obtained from several sources which indicated LSD demonstrations or practical exercises were given to several Advanced Officer Classes and Noncommissioned Officer (NCO) Classes between 1959 and 1962. However, except for the tests already listed and some correspondence relating to a LSD practical exercise for an NCO Class on 28 October 1960,[27] no other records were found which would verify the number and type of tests conducted at Fort McClellan. Individual medical records maintained at Edgewood Arsenal indicated that 195 individuals participated in tests at Fort McClellan, at least 113 of whom received a chemical agent. The records of the remaining 82 subjects did not indicate whether the tests involved a chemical agent.[48]

## Compliance With Chief of Staff Memorandum 385

Although records were not available to substantiate compliance or noncompliance with Chief of Staff Memorandum 385, there were several indications that the voluntary nature of the students' participation was in question. Additionally, one of the individuals interviewed recalled that a friend of his at the School had volunteered for the test program, but apparently had received a dose of LSD without advance warning and at an unanticipated time.[32] Although this individual was listed on the roster as having received LSD on 29 October 1959, it could not be determined if he had received additional doses.

The use of the term "demonstration" in conjunction with administering LSD to students and faculty at Fort McClellan raised a question of whether the tests violated the principles or intent of Chief of Staff Memorandum 385. The issue of demonstrations vs. experiments was the subject of considerable discussion between the responsible physician, Chemical R&D Laboratories; the Commander, Chemical R&D Command; the Director of Military Operations, Office of the Chief Chemical Officer; and the Commandant of the Chemical Corps School. The records of the discussions and correspondence provided a good insight into the different attitudes, concerns, and policy interpretations existing at the time and are addressed in the following paragraphs

A letter, dated 31 August 1960, subject: LSD Demonstration, from the Commander, Chemical Corps R&D Laboratories, to the Commanding General, Chemical Corps R&D Command, requested relief from the task of administering LSD to personnel attending the Chemical Corps School. Several reasons for not continuing the detail were provided, none of which concerned the question of compliance with established policy. The Commanding General, Chemical Corps R&D Command, responded to the request with a series of decisions which reportedly were based on previous discussion of the subject. The Laboratory was required to conduct "only one more such demonstration for the current Advanced Class." Additionally, the Laboratory was to train a medical officer, assigned to the Chemical Corps Training Command, to conduct such demonstrations at the School and elsewhere. The policy that the responsible physician was "personally responsible for the use of experimental chemical agents on humans" was restated. Also, all demonstrations conducted by the Chemical Corps Training Command using LSD required approval by the responsible physician.[25]

In effect, this exchange eased the burden on the Laboratory for administering LSD to Chemical Corps School students, directed that another doctor be trained, and pinpointed the responsible physician's responsibility and authority. However, it did not address whether "demonstrations with LSD" were in accord with policy governing the use of human volunteers in research.

On 8 November 1960 the Commander, Medical Research Laboratories (the designated responsible physician) wrote to his next superior, the Commander, Chemical Corps R&D Laboratories.[26] In this letter he challenged the decisions as well as the reported basis for those decisions. Specifically, he stated that he had agreed only to conduct tests relevant to scientific research and not demonstrations with LSD or the other matters decided. Accordingly, he withdrew whatever concurrence he may have given during the earlier discussion and instead provided a policy statement to guide the use of LSD-25 in human subjects, quoted below in part.

> No moral or ethical basis exists for the exposure of human subjects to pharmacologically active agents for purposes of "demonstrations." The choice of the term "demonstration" in basic reference is one of the most telling arguments contained therein. Whereas no legal basis has ever been established for experimentation on humans, nevertheless the officer and civilian physicians of the Chemical Corps feel morally, ethically, and professionally justified (both as physicians, and as professional civil and military servants of the nation) in using human subjects for research in, or under the control of, the Chemical Research and Development Laboratories. Any use of LSD 25 in which we participate will be an experiment, not a demonstration.[26]

Several other restrictive and/or explanatory clauses also were included in the policy statement.

A 1st Indorsement, dated 10 November 1960, to the above-referenced letter established that the Commander of the Chemical Corps R&D Laboratories not only supported the responsible physician's viewpoint regarding human experimentation, but also recognized his authority as the Secretary of the Army's designated representative to establish such policy. As a result of the action, the Commanding General, Chemical Corps R&D Command, on 21 November 1960, rescinded his earlier decision and indorsed the responsible physician's policy statement.[26]

The next exchange in this controversy involved a letter from the Chemical Corps School, subject: Support for LSD-25 Exercises, dated 13 October 1960, to the Commander, Chemical Corps R&D Laboratories, in which it was recognized that the Medical Research Laboratory would support only one more LSD-25 practical exercise at the Chemical Corps School, and also advised that with the Laboratories' assistance on this exercise, the School would be able to conduct future exercises, calling on the Laboratory only for the chemical agent. The letter continued by requesting assistance for a 28 October 1960 Advanced NCO Class exercise, although emphasizing that the School understood that the Laboratory would have preferred to participate in the exercise for the Officer Career Class. By 1st Indorsement the Commander of the Laboratory advised that they would be unable to participate in the exercise for the NCO Class on 28 October 1960, but that selected NCO students and staff could be included in the planned December exercise for the Advanced Officer Class. By 2d Indorsement, dated 4 November 1960, the Commandant, Chemical Corps School, expressed appreciation to the Chemical Corps R&D Laboratories for the assistance provided on 28 October 1960 for the LSD exercise. It also mentioned that two doctors from Fort McClellan participated and that in the future they would not require any assistance from the Laboratories except for requesting the chemical agent. By 3d Indorsement, dated 10 November 1960, the Laboratory Commander advised the Commanding General, Chemical Corps R&D Command, of the recommendation of the responsible physician that experimentation on humans with LSD-25 follow certain defined protocols, and again restated that only the responsible physician could approve tests with LSD. By 4th Indorsement the Commanding General, Chemical Corps R&D Command, advised the Office of the Chief Chemical Officer that the interpretation of the responsible physician's authority and responsibility was correct and that only he could approve experiments involving human subjects.[27] Nowhere in this correspondence do we find reference to Department of the Army policy as expressed in Chief of Staff Memorandum 385, or discussion about whether the "demonstrations or practical exercises with LSD" were violations of that policy. However, the available evidence indicated that the responsible physician attempted to terminate demonstrations with LSD as unnecessary for scientific research.

The evidence did not clearly establish the necessity for tests conducted at Fort McClellan. On the contrary, the indications were that the tests were conducted for other than necessary scientific research, which was a violation of Chief of Staff Memorandum 385.

In summary, available evidence indicated that LSD field testing at Fort McClellan may have started as early as May 1959 and included several officer and NCO classes. The records indicated that the last test at Fort McClellan probably was conducted in December 1960, although there may have been other tests. Some credence was lent to this belief of subsequent tests by the testimony of a witness, who stated that he and another doctor took LSD at the Chemical Corps School in January 1961. He also stated that he was an observer at other LSD tests during 1961.[24]

## Field Testing - Fort Benning, GA

The third series of field testing of EA 1729 was conducted at the U.S. Army Infantry School, Fort Benning, GA, on 8 January 1960.

### Purpose

The purposes of this test were to familiarize volunteer Infantry officers with the symptoms, reactions, and recovery response when an individual was actually subjected to a measured dose of LSD-25; to determine whether the incapacitation produced by LSD-25 was of military value; and to determine the situations in which it would be useful and usable.[37]

Authorization

On 25 August 1959 the Office of Chief Chemical Officer requested the CG, USCONARC, to authorize Chemical Corps personnel to administer LSD-25 to approximately 30 volunteer students of the Advanced Class at the U.S. Army Infantry School and of the regular class at the Command and General Staff College, Fort Leavenworth, KS.[38] On 4 September 1959 HQ USCONARC notified the Commandant, U.S. Army Infantry School (USAIS), Fort Benning, that they agreed with the concepts of further evaluation of the agent, subject to the availability of facilities and sufficient volunteers, and authorized the Commandant to communicate directly with the Chief Chemical Officer on the evaluation.[41] On 23 September 1959 the Director, Command and Staff Department, USAIS, in a disposition form to the Director of Instruction, advised that HQ CONARC had directed the Infantry School to cooperate with the Chief Chemical Officer in the evaluation of LSD-25.[39]

This is the first instance in which a clear record was available showing the request procedures followed in preparing for a field evaluation of LSD-25.

Conduct of Test

Based on the approval to administer LSD-25 to Advanced Officer Class student volunteers at the USAIS, preparation for the test program was made and consisted of an orientation phase and three action phases.[37]

Orientation Phase. On 13-14 November 1959 the Assistant Chief, Clinical Research Division, gave a general briefing on psychochemicals to the two Advanced Classes of the Infantry School.[36] Of the approximately 340 members of Infantry Officers Advanced Classes I and II, 135 students volunteered to take part in the test.[37] This number was reduced eventually to 41 volunteers.

Action Phase I. On 8 December 1959 a member of the Psychology and Human Factors Engineering Branch supervised the administration of the Minnesota Multiphasic Personality Inventory (MMPI) and completed plans for clinical evaluations at the Martin Army Hospital. The test material was to be returned to the Clinical Research Division prior to 1 January 1960 for scoring and evaluation.[36,40,41]

Action Phase II. On 15 December 1959 the volunteers were examined at the Martin Army Hospital. The physical examination for the human volunteer program included the completion of Standard Form 88, Report of Medical Examination, on each volunteer, except for the dental, chest X-ray, vision, and audio portions of the examination. It was stressed that the Standard Form 89, Report of Medical History, would be completed in full with special emphasis given to the following points which required definite positive or negative statements: history of allergy of any type, asthma, etc.; drug sensitization or reactions; immunization reactions; hepatic disease—cirrhosis, hepatitis, etc.; epilepsy or seizures; and ulcers, duodenal or peptic.[36,41] To avoid the compartmentalized "draft board" type examinations, each volunteer was examined by a single physician in an individual quiet room.

Prior to the final phase, the 41 officers selected for the test were checked by personnel from the Medical Research Directorate, Edgewood Arsenal, and as a result, 17 officers from each of the two Advanced Classes were selected to receive the drug; the remaining 7 officer volunteers were to serve as controls, receiving only water. The selection decisions were based on a review of the physical examinations, review of the MMPI tests, and finally, on the previous experience of the Chemical Corps personnel regarding tests of this nature.[36]

The Command and Staff Department, USAIS, prepared a detailed plan for the actual test, to include logistic and facilities support, security personnel, medical support, and instructional classes to be given to the volunteers after they received LSD.[40]

Action Phase III. The actual test was conducted on 8 January 1960. After a short briefing, the volunteers received LSD-25 in water, except for the 7 control volunteers who received plain water. The dosage ranged from 100 to 200 micrograms total dose, given orally and according to the volunteer's body weight.[36] Throughout the test, strict controls were maintained. The subjects were requested to record their observations and feelings continuously throughout the test. These written comments provided a unique insight into the effects of LSD on individuals.[35]

During the following 24 hours, two of the volunteers exhibited nausea and dizziness. At 0630 hours, 9 January 1960, all volunteers were checked by medical officers and released; no untoward reactions were noted.

The only recorded complaint of an adverse reaction because of the test was an allegation that one of the volunteers developed epilepsy approximately two years after ingesting LSD.[42]

## Compliance with Chief of Staff Memorandum 385

Although the records concerning the actions preceding and during the field test were accurate and in considerable detail, the individual records, to include volunteer statements, physical/mental examinations, and other data relevant to the actual test, were not available. As such, comments as to compliance or noncompliance with policy regarding use of humans in research are only as accurate as those records which were available. It appeared that the officer students were informed fully about the test, the drug and the probable effects, and their volunteer actions were in accordance with Chief of Staff Memorandum 385.

The cited purpose of the test appeared to indicate that the research was necessary and that minimum numbers of volunteers were used. However, in view of the tests or demonstrations conducted earlier at the Chemical Corps School, the actual need of the Fort Benning field test was questionable.

## U.S. Army Command and General Staff College, Fort Leavenworth (USACGSC), KS

Earlier in this section it was mentioned that the request from the Office of Chief Chemical Officer to the CG, USCONARC, also included 30 officer volunteers from the USACGSC to be tested with LSD-25. On 19 February 1960 the Commandant, U.S. Army Command and General Staff College, wrote the Chief Chemical Officer in reference to participation in the LSD test.[38] The letter stated that in view of the discussions and the comments of the two USACGSC observers to the Fort Benning tests, it was agreed that participation of the College in the further evaluation of LSD-25 would be suspended. This action was taken because substitute agents would be developed and would require evaluation and testing at some future date.[43] No other information was obtained which indicated that any tests involving human volunteers were conducted at the U.S. Army Command and General Staff College.

## Field Test - Dugway Proving Ground, UT

During the research effort a document was discovered which indicated that a field test was conducted at Dugway Proving Ground, UT, on 25 September 1959, and involved four officer personnel assigned to Dugway.[44] There were informal references made concerning this test, in which four instructors at Dugway Proving Ground were administered LSD-25 and their subsequent efforts to teach a class while under the influence of the drug were observed and evaluated.

There were no other records found concerning this test, the volunteer aspects of the test, or the test results. However, since this test took place during the same general timeframe as the Fort Bragg, Fort McClellan, and Fort Benning tests, it was assumed that the same general procedures were followed as concerns purpose of the test, method of obtaining volunteers, and medical, psychiatric, and psychological examinations.

## Field Test - Dugway Proving Ground, UT

A multi-phase field test involving the dissemination of agent BZ, a benzilate, was conducted at Dugway Proving Ground, Dugway, UT, during the period 12-26 November 1964, by personnel from Edgewood Arsenal. The name "Project Dork" was assigned to this field test.

### Purpose

The purposes of "Project Dork" were to test the effective dosage of BZ when disseminated in the open and to collect information on the treatment of BZ induced delerium.

There had been extensive clinical testing with BZ on volunteer subjects at Edgewood Arsenal, however, no observations had been made on the effectiveness of the agent when disseminated under field conditions. Previously, field tests involving dissemination of an agent had been disapproved on medical grounds because of lack of control over dosage and difficulty of managing exposed individuals. However, recent gains apparently had overcome these obstacles and it was now considered feasible to conduct such field tests on humans.[46]

### Authorization

The basic authorization to conduct experiments with benzilates was contained in a memorandum from Secretary of the Army Brucker to the Chief of Staff, subject: Use of Volunteers in Research, dated 8 October 1959.[47]

On 29 October 1964, during a conference at Edgewood Arsenal, a Department of the Army (DA) requirement to conduct a high priority program to determine the feasibility of dissemination of BZ agents in effective concentrations to distances of 1,000 yards against a point target was made known, as was the desire for volunteer field exposures to be completed on an urgent basis.[46]

### Field Test

Selection of Volunteers. Approximately 10 volunteers were selected from 300 available volunteers in the Sixth U.S. Army area. They were selected on the basis of a personal history questionnaire and evaluation of Minnesota Multiphasic Personality Inventory tests. Complete medical evaluation, to include CBC, ECG, EEG, chest X-ray, liver and kidney function tests, and psychological interviews were conducted at Edgewood Arsenal. Volunteers received numerous incentives, including weekly three-day passes, TDY payment, etc.[46] Of the 10 volunteers initially selected, 8 were exposed to the agent.

The test itself involved the exposure of the 8 subjects in groups of 4, slightly more than 3 days apart. A variety of military tasks were performed and evaluated. Throughout the test stringent medical and other safety controls were in effect. All subjects, following physostigmine medication, showed a complete return to a normal neurologic status.[45,46]

A review of the two documents available on "Project Dork" indicated that tests produced positive results.

Compliance with Chief of Staff Memorandum 385

No individual volunteer records were available for these tests. Evidence available in the referenced reports indicated full compliance with Chief of Staff Memorandum 385.

Summary - Field Test Phase

In summary, during the period September 1958 to November 1964 a series of field tests involving the use of LSD, and in one instance the use of agent BZ, on human volunteers were conducted at various military installations in the United States. A recapitulation of the estimated number of volunteers used in each test is listed below:

| Location of Test | No. of Volunteers (Est.) | No. of Volunteer Medical Records Available* |
|---|---|---|
| Fort Bragg, NC | 73 | 104[a] |
| Fort McClellan, AL | 191 | 195[b] |
| Fort Benning, GA | 41[c] | 42[d] |
| Dugway Proving Ground, UT | 4 | 4[d] |
| Dugway Proving Ground, UT | 10 (Agent BZ) | 0 |
| | 319 | 345 |

*Indicated medical records for individual volunteers maintained at Edgewood Arsenal, or in some cases merely record of volunteer participation.

a. Edgewood Arsenal medical records are available for 104 individuals. 80 of the records indicate drugs were used, 24 do not indicate the dose or drugs.

b. Of the 195 records, 113 indicate the use of drugs, 82 do not.

c. 41 volunteers (34 were drugged, 7 were not).

d. Only available records are list of names--no medical records.

## CHAPTER VIII

## FOOTNOTES

1. Report of the Ad Hoc Study Group on Psychochemical Agents, Office of the Assistant Secretary of Defense, Research and Development, 19 November 1955.

2. Disposition Form, subject: Additional Use of Volunteers in CW Research, from CMLC Research and Development Command, to Chief Chemical Officer, dated 22 March 1956.

3. Memorandum for Chief of Staff, U.S. Army, subject: Proposed Chemical Corps Plan for the Use of Volunteers in CW Research, dated 17 May 1956.

4. Copy of teletype from Commanding General, CONARC, to Commanding General, U.S. Fourth Army, ATCML 300853, dated 28 June 1958.

5. Draft report (copy), Headquarters, XVIII Airborne Corps Artillery, Ft. Bragg, subject: BW Laboratories - Ft. Bragg Tests, undated.

6. Meeting of the Medical Committee, U.S. Army Chemical Corps Advisory Council, 3-4 November 1958, Fort Detrick and Army Chemical Center, MD.

7. U.S. Army Chemical Research and Development Laboratories Technical Report, CRDLR 3074, June 1961, Clinical Investigation of EA 1729; by Van M. Sim, June 1961.

8. Disposition Form, subject: CWL - Fort Bragg Tests, dated 31 July 1958, from CWL, ACC, to Corps Chemical Officer.

9. Story Plan - Fort Bragg Film, with inclosure, undated.

10. Disposition Form, CMLRD-CW-M(C), from Chief, Clinical Research Division to Deputy Director of Medical Research and Director of Medical Research, subject: Brief Summary of Work on Ft. Bragg Tests Covering period from 2 Sept - 13 Sept 1958, dated 23 September 1958.

11. Testimony of MG (Ret) Lloyd E. Fellenz, taken at St. Petersburg, FL, on 28 August 1975.

12. Disposition Form, CMLRD-CW-M(C), subject: Fort Bragg Tests, from Chief, Clinical Research Division to Director of Medical Research, dated 17 September 1958.

13. Chief of Staff Memorandum through Assistant Chief of Staff, G4, for Chief, Chemical Officer and The Surgeon General, CS: 385 (30 June 1953), subject: Use of Volunteers in Research.

14. Fort Bragg Roster, undated.

15. Testimony of COL Lawrence W. Jackley, 24 July 1975.

16. Memorandum for Record: SWCAC-CD 400/UW/9/1/13, U.S. Army Special Warfare School, Ft. Bragg, NC, dated 6 October 1958, subject: Report of Tests of Chemical Agent K-EA 1729(U).

17. Undated three page insert for Dr. Silver's speech, with a two page inclosure, title: Summary of Review of Special Forces Tapes, made 29 Sept - 1 Oct 58.

18. Letter, reference: CMLRD-CW-M(C), to CPT E. R. Clovis, Clinical Research Division, U.S. Army CWL, Army Chemical Center, MD, from Headquarters, U.S. Army Special Warfare School, Ft. Bragg, NC, dated 10 November 1958, with inclosure: Special Test Situations.

19. Letter, (CMLRD-CS-M(C), to CPT L. W. Jackley, U.S. Army Special Warfare Center, Combat Development Office, Ft. Bragg, NC, from CPT E. R. Clovis, Clinical Research Division, dated 30 October 1958.

20. Letter (SWCAC 380.01) from Headquarters, U.S. Army Special Warfare School, Ft, Bragg, NC, to Dr. Van M. Sim, dated 23 October 1958.

21. Statement of MG (Ret) J. J. Hayes, dated 14 August 1975.

22. Roster, LSD Participants, dated 28 October 1959, 29 October 1959 and 30 October 1959.

23, Letter to Secretary of Defense, dated 24 July 1975.

24. Statement of George F. Solomon, MD, dated 6 August 1975.

25. Letter, CMLRD-CR-DSA, Headquarters, U.S. Army Chemical Research and Development Laboratories, Army Chemical Center, MD, dated 31 August 1960, subject: LSD Demonstrations, and 1st Indorsement, dated 11 October 1960.

26. Letter, CMLRD-CR-M, Headquarters, Army Chemical Center, MD, dated 8 November 1960, subject: Use of Incapacitating Agents on Human Subjects (U), with attached 1st Indorsement, dated 10 November 1960, and 2d Indorsement, dated 21 November 1960.

27. Letter, Headquarters, U.S. Army Chemical Corps School, Fort McClellan, AL, dated 13 October 1960, subject: Support of LSD 25 Exercise, with four Indorsements.

28. Letter, CRD/D, Chief of Research and Development, to Dr. Harold G. Wolff, dated 9 January 1957, subject: Human Volunteer Tests with K Agents (C), with attached Memorandum for Record.

29. Meeting of the Medical Committee of the U.S. Army Chemical Corps Advisory Council, 15-16 June 1959, at Fort Detrick and Army Chemical Center, MD, issued, November 1959.

30. Meeting of the Protective Committee, U.S. Army Chemical Corps Advisory Council, 16-17-18 March 1959, Fort McClellan, AL, issued, July 1959.

31. Paper titled, Field Training Tests, undated and unsigned.

32. Statement of LTC (Ret) Paul J. Walsh, dated 26 August 1975.

33. Disposition Form, dated 11 February 1966, subject: Transmittal of eport on LSD, from Medical Research Laboratory to the Director, Research Laboratory, with inclosures.

34. Roster of Volunteers (EA 1729), Fort Benning, dated 8 January 1960.

35. Section VI, Written Comments of Volunteers Following Completion of Test.

36. Disposition Form, dated 19 January 1960, subject: Trip Report to Fort Benning, GA, from Chief, Experimental Medicine Branch to Director of Medical Research.

37. Evaluation Report, Psychochemical Agent (LSD 25).

38. Letter, CMLPD-O, subject: Determination of Possible Military Uses of LSD 25 by Administration to Students of the Advanced Class at the U.S. Army Infantry School and Command and Staff College (Short Title: Evaluation of LSD 25), from Office of the Chief, Chemical Officer to the Commanding General, US CONARC, dated 25 August 1959.

39. Disposition Form, dated 23 September 1959, GNKEAD-A, subject: Evaluation of LSD 25 (C) from Director of Instruction, U.S. Army Infantry School, to Director, Command and Staff Department, U.S. Army Infantry School.

40. Plan of Test, Evaluation of LSD 25, undated, Command and Staff Department, U.S. Army Infantry School, Fort Benning, GA.

41. Letter, ATTNG-SCH, Headquarters, US CONARC, subject: Determination of Possible Military Uses of LSD 25 by Administration to Students of the Advanced Class at the U.S. Army Infantry School and Command Staff College (Short Title: Evaluation of LSD 25), undated.

42. Case File, Jordan, William R., LTC (Ret), Fort Benning, GA.

43. Letter, ALLDOC 252/6, U.S. Army Command and General Staff College, Fort Leavenworth, KS, to Chief Chemical Officer, Department of the Army, dated 19 February 1960, subject: Evaluation of LSD 25 (C).

44. Roster, Dugway Tests, 25 September 1959.

45. Edgewood Arsenal Technical Report, EATR 4140, The Human Assessment of BZ Disseminated Under Field Conditions, dated November 1967.

46. Report of Dork Program, A Feasibility Study and Human Assessment of BZ Disseminated Under Field Conditions, dated December 1964.

47. Secretary of the Army Memorandum for Chief of Staff, subject: Use of Volunteers in Research, dated 8 October 1959.

48. Paper titled, Areas Where Testing Occurred, provided by the Edgewood Arsenal Medical Records Custodian, 27 January 1976.

## CHAPTER IX

## INTELLIGENCE CORPS EXPERIMENTATION WITH HALLUCINOGENIC DRUGS (U)

### General

(U) ~~(C)~~ The purpose of this chapter is to explain hallucinogenic type drug experiments conducted by elements of the U.S. Army intelligence community in conjunction with elements of the U.S. Army Chemical Corps. This phase of the volunteer program is presented in a separate chapter because of its unusual relationship with the Edgewood phase of psychochemical drug experiments, field tests, and operational use of drugs for interrogation purposes.

(U) As mentioned earlier in discussions concerning the "threat," the intelligence community was well aware of psychochemical drug interest in the early 1950s by potential enemies of the United States. Moreover, the Intelligence Corps was continuously striving to improve their own interrogation methods as well as attempting to better understand the methods and means used by other nations. Also, as discussed earlier in this report, the Chemical Warfare Laboratories at Edgewood received authority to use human volunteers in psychochemical drug experiments in May 1956 and the Medical Research Laboratories at Edgewood initiated LSD (EA 1729) drug studies in late 1956.

### Intelligence Corps Testing at Edgewood

(U) Available records indicated that officials from the Intelligence Center at Fort Holabird and the Chemical Warfare Laboratories began coordination of a joint psychochemical drug project in November 1957. Some planning and informal coordination of a possible joint project apparently was conducted in late 1957 and early 1958.[1] In May of 1958 a testing program was discussed in earnest between the project officers from the Intelligence Board, located at Fort Holabird, MD, and the Medical Research Laboratories at Edgewood Arsenal. As a result of that meeting, the President of the Intelligence Board sent an informal plan to the Medical Research Directorate of the Chemical Warfare Laboratories on 3 June 1958.[2]

(U) ~~(C)~~ The proposed plan, however, was evidently well known and reviewed by the Laboratory staff at Edgewood months before it was officially sent to them. This conclusion was drawn based on documents, dated in March 1958, which indicated a thorough review of the plan had been conducted at Edgewood.[4] The plan, entitled, "Material Testing Program EA 1729," included detailed discussion of the "method of approach to Prospective Volunteers," which provided that prospects would be initially selected based on their official personnel records and security clearance information. Next, the prospect

~~The Inspector General~~

was to be approached on a personal basis and told that the official classified project would make mental and physical demands upon him. If the prospect was interested, he would be required to sign a security statement (declaring that he would protect the classification of the project). The plan allowed for a very general explanation of the project but noted "care will be exercised not to mention to the prospect the exact properties of the material which lend themselves to intelligence application." It called for the prospect to sign a volunteer statement very similar in content to the statements used in the Edgewood volunteer program. Under a discussion of "Preliminary Tests for Volunteer Prior to Program Testing," the plan provided that a complete mental and physical examination as well as other testing would be completed prior to the use of any volunteer in the program. The first visit of the volunteer group to Edgewood was planned to include "physical examination, group and individual unwitting reaction test and group orientation."

(U) ~~(C)~~ Specifically, the plan established that: "The first visit of the volunteer group to ACC [Army Chemical Center, Edgewood] will be planned for three purposes: physical examination, unwitting reaction test, and group orientation of test program. A period of a three-day stay will be required. The schedule will call for physical examinations during morning and afternoon of the day of arrival with those physically unfit being excused from further participation. In the early evening of the first day after arrival at ACC, the group will meet in a room provided by ACC staff. In the course of this gathering, alcoholic beverages will be served to the group. Prior arrangement will have paired each member of the volunteer group with a trained interrogator not known to the subject. The interrogator will have had an opportunity to study the dossier of the subject to be observed and will have been provided sufficient additional information by which to accomplish the purpose of the exercise and to simulate a social situation comparable to a diplomatic cocktail party where an attempt will be made to derive classified information from unwittingly material-influenced subjects. All beverages, alcoholic or otherwise, served to volunteers will have included sufficient 'EA 1729' for at least effective dosage of all concerned. During the course of the gathering, individual observers will attempt to associate with their designated subjects and, using guidelines provided by ACC personnel, derive the desired information as determined from previously furnished background information on the specific volunteer. Observations of the individual under group conditions will be followed by personal individual interview. Where necessary, the observer may administer an additional dosage during this contact with his subject. Arrangements will have provided facilities for each pair to withdraw for such personal interview purposes. Volunteers will be given to understand that such interview is a normal preliminary to the overall testing program. The purpose of the individual interview will be for comparison purposes with a second personal interview to be conducted by the same observer on the following day when the volunteer is no longer demonstrably under the influence of the material. The volunteer will be given to understand that this second interview is an extension of that of the previous day. On the afternoon of the second day, the group will again meet for the purpose of general orientation. They will be told of the experiment of the previous day. General orientation will be by ACC representatives and will cover the following: nature and history of the material, previous experimentation conducted, role of instant volunteers in contemplated testing program, etc. The volunteers will be told that they have been selected on the basis of their military intelligence background as persons acutely security conscious and experienced in withholding information or extracting it from unwitting subjects; this for the purpose of testing the material for intelligence application under the most rigid conditions."[1]

(U) ~~(C)~~ Other planned tests provided for subsequent visits to Edgewood by the volunteer group and included: "Personality Profile Determination Through Interview and Effectiveness of Structured Interview Conducted by Untrained Personnel," which was to determine the ability of lay personnel, given proper instruction and training and a prepared structure of an interview, to obtain from a subject the basic information required for personality interpretation; "Comparative Before/After Reactions to Polygraph Examination," which was to determine if a subject is capable of carrying through a deliberate falsehood while under the influence of EA 1729 (LSD); "Memory Impairment Tests," which were to evaluate the effect of the material (LSD) on retention ability of subjects; "Specialized Motor Reaction Memory Testing," which was to evaluate the impairment of simple motor reactions of volunteers after ingestion of LSD; "Effect of Environment and Physical Condition," which was to evaluate the effect of LSD on a volunteer under various environments and physical conditions to include total isolation and hostile interrogation situations; and "Influence of Material Under Artificially Created Stress Situations," which was to determine the ability of the volunteer to withhold information under unusual stress as well as the influence of LSD.

(U) No evidence was found to establish that this plan was approved at any level above the President of the Intelligence Board or the Director of the Medical Research Laboratories at Edgewood. At least one document which contained the proposed plan was sent from the Intelligence Center to the Commanding General, Edgewood; that document was signed by the Adjutant General for the Center Commander, indicating that the Intelligence Center Commander may have approved the program from the Intelligence Corps side.[5] However, the former Commander of the Intelligence Center testified that he did not have knowledge of the plan beforehand and that it was entirely possible that letters left his command signed in his behalf without his knowledge. He further stated that although the Intelligence Board was located within his command, it reported directly to the Office of the Assistant Chief of Staff for Intelligence, Department of the Army, for operational matters of that nature.[6]

(U) The Intelligence Board Project Officer confirmed in his testimony that the authority line for the Intelligence Board was direct to the Assistant Chief of Staff for Intelligence (ACSI). He further testified that it was his impression that no definite decision could have been made at Holabird to participate in the test at Edgewood without approval of the ACSI.[3] That belief, however, was not confirmed by former members of the ACSI staff. Additionally, no evidence was located to establish that the Medical Research Laboratories sought approval through Chemical Corps channels or that The Surgeon General's Office was given the opportunity to review the plan. On the contrary, indications were that Medical Research Laboratories considered the conduct of the experiment with Intelligence Corps volunteers to be within the scope of approval granted to them in May 1956 to use human volunteers in psychochemical drug studies. Furthermore, the Chemical Corps apparently funded these experiments, to include per diem and travel allowances for the volunteers.[7]

(U)~~(C)~~ Records of the Medical Research Laboratory at Edgewood and the Intelligence Center at Fort Holabird reflected that the experiments were conducted (generally as planned) between August 1958 and May 1960. The experiments were divided into two phases: the first phase (series of experiments) was conducted from August to November 1958;[2] and the second phase from September 1959 to May 1960.[12] Each phase began with the planned "Unwitting Reaction Tests" or "Contrived Social Situation,"[8,9] and included three additional major experiments. The following is a breakdown of the tests by phase, dates of conduct, and reported participants:

| EXPERIMENT | DATE(S) | NO. OF VOLUNTEERS |
|---|---|---|
| PHASE I[2] (14 August-21 November 1958) | | |
| Unwitting Reaction/Contrived Social Situation[8,9] | 14 Aug 58 | 13 |
| Polygraph/Interrogation Tests[11,8] | 14-21 Aug 58 | 14 |
| Isolation/Sensory Deprivation Tests[8,10] | 2-21 Nov 58 | 10 |
| Retention and Recall Tests[8] | 2-21 Nov 58 | 10 |
| PHASE II (10 September 1959-6 May 1960) | | |
| Contrived Social Situation[8] | 10 Sep 59 | 12 |

| | | |
|---|---|---|
| Isolation Tests[14] | 3 Nov-17 Dec 59 | 12 |
| Retention and Recall Tests[8,14] | 3 Nov-17 Dec 59 | 12 |
| Polygraph Tests[8,15] | 29 Apr-6 May 60 | 12 |

(U) The exact number of volunteers used in these tests could not be determined. However, evaluation of testimony, travel orders, and reports indicated that 30 to 35 different volunteers were used, some of whom may not have received a drug but performed a technical service such as operation of a polygraph machine. Moreover, it was not possible to determine the number of times the volunteers (individually or collectively) received LSD. Some volunteers may have received 20 or more doses of LSD over the period of nearly two years covering both phases of the tests.[16]

(U) ~~(C)~~ The evidence clearly established that the volunteers did not render their "informed consent" prior to the first occasion they received LSD. Moreover, there was a deliberate effort to deny them any information that would permit them to make a knowledgeable evaluation of the hazards involved in their participation. The failure to inform the volunteers of even the fact that they would receive a drug must be shared by both the Intelligence Board, as initiator of the tests, and the Medical Research Laboratories, as the medical investigators. However, it must be noted that following the initial surreptitious administration of the drug, the volunteers were provided a full explanation of the drug properties and a briefing on the remainder of the project. There was no indication that any subject withdrew his consent or declined to return for subsequent ingestions of LSD.

(U) One witness testified that he was asked to volunteer in such a manner that he believed his refusal to participate would have placed him in disfavor with his immediate superior.[17] However, other Intelligence Corps volunteers testified that no pressure was exerted to cause them to volunteer, nor were they placed in a position that made participation appear to be their military duty.[16,18,19] The project officer testified that several prospects he approached declined to participate and their disinterest was not mentioned to anyone.[3] That is not to say that pressures were not brought to bear on certain subjects, rather, that the majority of the evidence indicated the subjects were highly dedicated Intelligence Corps officers and enlisted men who entered the program and remained in it because they believed they were making an important contribution to the Corps and perhaps to national defense.

## Field Testing

(U) Following the first phase of Intelligence Corps tests (November 1958), the Chief of the Clinical Research Division at Edgewood, in a letter to the

Commanding General, Army Intelligence Center, advised that all work on the initial plan had been completed and the results were rewarding. The letter also stated: "It is recommended that actual application of the material [referring to LSD] be utilized in real situations on an experimental basis, if possible. We shall be happy to assist your personnel with both medical and material problems."20

(U) ~~(C)~~ On 21 January 1959 the U.S. Army Intelligence Center reported back to Edgewood: "This headquarters has forwarded your letter to the Assistant Chief of Staff for Intelligence (ACSI), Department of the Army, concurring in your recommendation that actual application of the material be utilized in real situations on an experimental basis."21 Indications were that the Intelligence Board project officer, in consort with Medical Research Laboratories representatives, prepared a plan to field test LSD as an aid to interrogation. In early March 1959 the Director of Medical Research at Edgewood alerted his next superior (Commander, Chemical Warfare Labs) that the plan would be submitted to him in a few days by the Intelligence Center.22 Other evidence indicated that, as intended, the Intelligence Center forwarded a testing plan, calling for use of LSD overseas on foreign nationals, to the Chemical Warfare Laboratories in March 1959. That route was apparently selected as the most rapid avenue to The Surgeon General.23

(U) ~~(C)~~ Reportedly, on 9 April 1959 the Chief, Research and Development, Office of The Surgeon General, was briefed by Chemical Warfare Laboratory and Intelligence Center representatives on "Material Testing Program, EA 1729" and the proposed plan for field experimentation. He was reported to have reserved judgment at that time, but later informally notified Edgewood that The Surgeon General would consider the plan if it was presented by the Assistant Chief of Staff for Intelligence (ACSI). Accordingly, the Intelligence Center sent the plan to ACSI to be coordinated with The Surgeon General, who "concurred in the finding of the Chemical Corps and offered no medical objections to the field experimentation plan."23 Apparently, as a result of that staff action, the Office of ACSI directed the Commander, U.S. Army Intelligence Center (USAINTC), to prepare a detailed staff study regarding the planned overseas test and to prepare a briefing for the ACSI on the matter. On 15 October 1959 USAINTC furnished the requested staff study to ACSI.23

(U) No further action was apparently taken on the approved overseas plan until completion of the second phase of the joint test that was conducted at Edgewood Arsenal during the period September 1959–May 1960.

(U) ~~(C)~~ On 8 August 1960 a liaison team, the "Office of Assistant Chief of Staff-Intelligence Liaison Team," was sent to Europe (USAREUR) to brief the European intelligence community on the Joint Intelligence Corps/Chemical Warfare Laboratories project for testing of LSD and to acquaint the G-2, USAREUR, with the proposed plan for field experimentation with LSD. The liaison team consisted of three members, the action officer from the Office of the Assistant Chief of Staff for Intelligence, Department of the Army (OACSI), the project officer from the U.S. Army Intelligence Board at Fort Holabird (USAINTB), and the project officer from the U.S. Chemical Research and Development Laboratories (USACRDL) at Edgewood. A report rendered by the liaison team upon their return to the United States included their itinerary, which indicated they personally briefed the G-2, USAREUR, as well as the commanding officers of the Military Intelligence Groups in Germany and France and a representative of the J-2 (Joint Intelligence) Office, European Command (EUCOM), in Paris, France.24

(U) ~~(C)~~ In general, it was agreed that the intelligence community in Europe would prepare a plan for implementation of the proposed "field test" and send it to Department of the Army. Further, it was to be the responsibility of the European command to select the subjects, who would be nonvolunteer, foreign nationals. The Department of the Army was to be responsible for providing a Special Purpose Team for the execution of the plan once it was finalized. It was also agreed that the Special Purpose Team (SPT) would include a qualified medical doctor and the necessary material (LSD) to conduct the experiments.24

(U) Available evidence reflected that upon their return from USAREUR, the liaison team briefed the Director of Security, Mapping and Combat Intelligence at OACSI, DA, on the results of their trip. Plans were made to brief the Assistant Chief of Staff, Intelligence (ACSI), following receipt of the G-2, USAREUR, plan which was expected on or about 15 September 1960.25 They also reportedly briefed the Assistant Chief Chemical Officer for Planning and Doctrine, who recommended that the Chief Chemical Officer and The Surgeon General be invited to the briefing for the ACSI.

(U) Records indicated that on 25 November 1960 the Deputy ACSI and the G-2, USAREUR, informally agreed on the working relationship for the planned European field tests.26b

(U) ~~(C)~~ On 7 December 1960 the project officer from USAINTC briefed the ACSI on the plan to conduct field tests of LSD in Europe. Also present at the briefing were representatives from the Office of the Chief Chemical Officer, DA, and The Surgeon General's Office.26d,27

(U) ~~(C)~~ A report of the briefing indicated that the ACSI was in agreement that a technique, such as that provided by employment of EA 1729, was required to enhance their conventional interrogation standards. He showed concern, however, in the matter of coordination with other agencies and asked if this project was coordinated with the CIA and FBI. The ACSI was informed that coordination had not been effected, but was planned after the field experimentation in Europe was concluded and the results confirmed the findings of the intelligence application. The ACSI reportedly remarked that: "his concern was that if this project is going to be worth anything it [EA 1729] should be used on higher types of non-U.S. subjects, and, as he put it, - staffers. This could be accomplished if the CIA was brought in." ACSI also remarked that: "maybe the FBI should be informed and to possibly join us to further develop the experimentation." The report noted that ACSI did not direct coordination with the CIA and FBI, but only mentioned it for consideration by the planners.[26d] The same document stated that coordination with the CIA would not be made until there was more factual findings from field experimentation.

[redacted] (U) No evidence was found to indicate that the plan was approved by the Chief of Staff of the Army or any office higher than ACSI. Moreover, there were no indications that the project was coordinated with the CIA, FBI, or any other office outside the Department of the Army.

(U) In January 1961 the Chemical Corps made an officer available to be a member of the Special Purpose Team,[26] who joined the USAINTB project officer. The third member of the team was a medical officer from Fort Totten, NY, apparently provided by The Surgeon General (assignment of medical officer by The Surgeon General was not confirmed by documentary evidence).

Operation Third Chance

(U) On 28 April 1961 the Department of the Army EA 1729 Special Purpose Team (SPT) departed for USAREUR to conduct a 90-day field experimentation program. The team consisted of: a medical officer (Army, LTC), Chemical Corps EA 1729 project officer (Army, MAJ), and the USAINTC project officer (Army, MAJ) representing OACSI. The code name "Operation Third Chance" was assigned to the field experimentation program. The objectives of the program were stated in the after action report as: "The overall purpose of the field experimentation phase of the EA 1729 testing program was to confirm or refute laboratory finding (1958-1960) in an effort to ascertain whether or not the EA 1729 technique could be employed as an aid to interrogation and whether or not the technique does enhance the exploitability of actual subjects of intelligence interest."[29]

(U) Evidence indicated that the operation started with a preliminary coordination conference at USAREUR to assure complete mutual understanding of policy and operational factors established for the program by OACSI. Following that conference, the team went to one of the Military Intelligence Groups to start the project.

(U) ~~(C)~~ All subjects to be used in the test reportedly were nominated by the sponsoring intelligence units on the basis of their being critical cases which were considered to be unresolvable through conventional interrogative or investigative techniques. The plan was to bring the subject to a prearranged operational site under a pretext designed to prevent his awareness of the actual purpose of his involvement in the test. A situation was devised whereby the subject was given a plausible reason for a physical examination by the SPT doctor. The subject was introduced to the other two members of the team in a social environment, during which the surreptitious administration of LSD was effected through a variety of beverages. Once the LSD had taken effect, the group moved to an interrogation room where the subject was exploited. Available reports indicated that the team's medical officer and psychologist were present throughout the interrogation in an advisory capacity.[29]

~~(C)~~ The team conducted experiments 5 USC 552 (b)(1) 5 USC 552 (b)(1) The report indicated that a total of 11 experiments were conducted involving 10 individuals (experimentation of one individual was repeated). All subjects, except one, were foreign national, Army intelligence sources and agents; the exception was a U.S. soldier who had been involved in a theft of classified documents. All subjects were nonvolunteers, although one man had agreed to take a "truth serum" test. However, he was administered LSD instead of a truth serum.[29]

(U) The U.S. Army soldier used in conjunction with "Operation Third Chance" reportedly had removed approximately 166 classified (SECRET) documents from the Staff Message Center, HQ USAREUR (REAR), COMZ, Orleans, France, on 14 March 1961. Between 15 March and 16 April 1961, during a standard military intelligence investigation, he formally confessed to taking the documents and allegedly disposing of them by rendering half of them illegible and throwing the remainder in a river. He was interrogated several times and was administered polygraph tests and a psychiatric evaluation. Subsequently, he changed his confession, contending that he threw all of the documents in the river. The military intelligence investigation continued to determine if espionage was involved. Records indicated that on 2 May 1961 the soldier was placed in "voluntary protective custody" in an off-post house and remained in such custody until 13 June 1961, when he was released to his unit. During that period he was evaluated by a civilian psychiatric consultant to The Surgeon General of the Army, who recommended the enlisted man be allowed to voluntarily be interviewed under sodium pentothal (narco analysis), which was conducted on 26 May 1961 by an Army medical doctor and an Army psychiatrist in a hospital environment. During the same month he was interviewed while under voluntary hypnosis. The interviews were followed by several psychiatric evaluations, one of which (June 1961) resulted in a recommendation that a "tension method aggravated by tension producing drugs" test might be useful.[30]

(U) Thus, sometime between 8 and 12 June 1961 the DA Special Purpose Team surreptitiously administered EA 1729 (LSD) to him and conducted an interrogation while he was under the effects of the drug. This event was reported as part of "Operation Third Chance." USAREUR was later granted clearance by the Department of Justice (which considered the case in light of the Atomic Energy Act) to initiate military justice proceedings against the soldier. Subsequently, a pre-trial investigation was conducted. The Commanding General, COMZ, after consultation with his Staff Judge Advocate and Intelligence Officer, elected not to court-martial the soldier, but instead directed initiation of procedures for administrative separation under the provisions of AR 635-209 (unsuitability). The decision was reportedly made in light of such factors as: prolonged interrogations which preceded the soldier's first confession; a requirement of secrecy that surrounded the activities of the DA Special Purpose Team; the possible unfavorable publicity arising from the soldier's recollection of the "bizarre methods" employed by the DA Special Purpose Team; and the unanimous opinion of the psychiatrists who evaluated the soldier that he had severe psychiatric disorders. The soldier subsequently waived his rights to counsel and to appear before a board and was separated from the service with a General Discharge on 23 October 1961.30,31,32

(U) ~~(S)~~ The Special Purpose Team returned to the United States in late July 1961. They concluded that a pressing need existed for advanced and unconventional techniques which would improve the capability of field intelligence units in the conduct of extensive and intensive special interrogations, and that the EA 1729 technique demonstrated promise of fulfilling that need to a significant degree. Among their recommendations were: "A comprehensive field testing program be established in conjunction with appropriate associated U.S. intelligence and security agencies for the scientific derivation of empiric data upon which to standardize the EA 1729 technique; and that future field experimentation utilize real subjects of actual cases for both research purposes and operational advantage."29

(U) There was no evidence found to indicate that any part of this so-called experiment was presented to or approved by the Army Chief of Staff or the Secretary of the Army. The evidence was clear that from the outset to the conclusion the project violated Department of Defense and Department of the Army policies and procedures for conduct of chemical/medical research. Moreover, by both intent and practice, the team used nonvolunteers and in all but one case non-U.S. citizens. Additionally, the use of the U.S. soldier was not experimental in nature but operational. Finally, the fault for the flagrant disregard for Department of the Army policies and directives was primarily that of the Assistant Chief of Staff, Intelligence, however, it must be shared by the Offices of The Surgeon General and the Chief Chemical Officer.

## Operation Derby Hat

(U) ~~(C)~~ Available evidence indicated that in December 1961, following the return of the Special Purpose Team from Europe, the decision was made at OACSI to explore the possibility of conducting similar experiments in the U.S. Army, Pacific (USARPAC).[33] On 27 February 1962 the Intelligence Corps project officer briefed the Assistant Chief of Staff, G-2, USARPAC on the "EA 1729 Program" at his Headquarters in Hawaii. The stated purpose of the project was: "The primary purpose of the field testing program will be experimental research under actual operating conditions, verification of previous laboratory and field test findings regarding the EA 1729 technique, and development of further data regarding operational employment of the material. Any operational gains accruing to individual cases selected for experimentation will be considered a collateral advantage."[34]

(U) ~~(C)~~ The initial tests were to start on or about 20 April 1962. In preparation for the new phase of testing, which was called "Operation Derby Hat," ACSI requested the Chief Chemical Officer to provide an officer as a member of a Special Purpose Team (SPT) for the USARPAC phase.[35] The Chemical Corps assigned the same officer who had represented them on "Operation Third Chance."[36]

~~(C)~~ In April 1962 the Intelligence Corps project officer was placed on orde for South Vietnam, thus, "Operation Derby Hat" was postponed pending selection of a replacement.[37] Two months later a replacement was selected and plans were made for a second liaison visit to USARPAC; the visit was scheduled for 18 June 1962.[38] The liaison trip to USARPAC, which included stops in Hawaii, Korea, and Japan, took place during the period 21 June-7 July 1962. Arrangements were made with the intelligence staff members 5 USC 552 (b) (1) to provide orientals of various nationalities for use in LSD experiments. Special efforts were made to insure that U.S. citizens were not used as subjects of the experiments.[42]

~~(C)~~ "Operation Derby Hat" began on 8 August 1962 with the three-member Special Purpose Team stopping in Hawaii to coordinate with the USARPAC G-2 before traveling (b) (1) where they administered LSD to 5 USC 552 (b) (1) subjects.[40a] The team stayed in (b) (1) until approximately 29 Septembe: 1962, when they moved (b) (1). While in (b) (1) they administered EA 1729 (LSD) to 5 USC 552 (b) (1) subjects. Each of those experiments was conducted in a manner similar to that employed in "Operation Third Chance."

~~(C)~~ At the end of October the team traveled to Japan, while the intelligence project officer took a side trip to Korea. While in Korea he was advised that a U.S. Army officer, who had worked on "Derby Hat" (b) (1) had been hospitalized for possible surreptitious administration of a drug. The entire Special Purpose Team returned to 5 USC 552 (b) (1) study the hospitalized officer.[401] In an effort to determine if the drug he had received was LSD, the team administered LSD to the officer, who reportedly volunteered to undergo the procedure in order that his reactions could be compared.[41] Although no documentary evidence was found regarding identification of the alleged first drug the officer ingested, a witness testified that it was concluded that the officer was not unwittingly given LSD but had simply drank too much.[41] Additionally, no record was found of the officer rendering an informed voluntary consent agreement. Nevertheless, the act of administering LSD to a U.S. citizen was at variance to instructions given the Special Purpose Team Chief in August 1962 by ACSI, who directed: "You are hereby instructed that under no circumstances will you use or allow to be used material EA 1729 on U.S. citizens."[42]

(U) In late November 1962 the SPT was reportedly in Tokyo when they received word from ACSI to remain in Japan for new orders. One member of the team had already departed for the United States; the other two remained in Japan pending further orders.[43] Meanwhile, the Office of the Assistant Chief of Staff, Intelligence, Department of the Army, made arrangements to extend the team's stay in USARPAC for the purpose of sending them to Saigon, South Vietnam. In a letter to the Commanding Officer, U.S. Army R&D Laboratory, Edgewood Arsenal, ACSI wrote: "In compliance with recent instructions from the Secretary of Defense, it was necessary to extend the travel activities of the team for an additional 60-day period. This, of course, requires the services of the two officers [from Edgewood]."[44] The memorandum affixed to the letter stated, in part: "Instructions received from SD required team travel to Saigon, Vietnam for additional 60-day period."[44]

(U) ~~(C)~~ The two members of the team who were delayed in Japan were directed to proceed to Saigon with an arrival date of 7 December 1962.[45] The third member, who had returned to the United States, testified that he was summoned to the Pentagon for an interview with the Assistant Chief of Staff, Intelligence. He was told to prepare to join the other members of the team in Vietnam and that he would be given a letter to deliver to the COMUSMACV personally. He further testified that he was advised that the need-to-know of the project was restricted to the Secretary of Defense, Chief of Staff, Army, ACSI, and Chief, MACV; not the Chairman of the Joint Chiefs of Staff or the Secretary of the Army.[43] The letter, which was reportedly opened in the presence of the three team members and the former project officer for "Operation Third Chance" (who was stationed in Vietnam), allegedly announced the Secretary of Defense's decision to use LSD on Viet Cong POWs and directed the Chief, MACV, to insist that the Vietnamese provide suitable subjects for the team.[43] The letter in question was not found during the research effort.

(U) ~~(C)~~ Sworn testimony from two of the three Special Purpose Team members and the former project officer of "Operation Third Chance" indicated that the Special Purpose Team did not administer, assist in the administration, or observe the administration of LSD to anyone in South Vietnam. The opinion of witnesses as to why the project was aborted varied. In fact, no two offered the same reason, which may indicate that there were many reasons or merely that their memory was dim on that particular point. At any rate, some of the reasons offered were: the difficulty in finding subjects that met the prerequisite constraints for their use; inability of the Chief, MACV, to insist on Vietnamese cooperation; and the non-availability of a site that provided the seclusion required for secrecy and physical security. Whatever the reasons, no evidence was found that LSD was used on any subjects in South Vietnam.

(U) Records indicated that in February 1963 the Chief of Staff, Army, requested and received the report on "Operation Third Chance," conducted in Europe in 1961, and a Fact Sheet on "Related Activities of December 1962-January 1963."[46] Although the Fact Sheet was not found, it was believed to have been in regard to the Special Purpose Team's activities in Vietnam.

(U) ~~(C)~~ At the conclusion of a 10 April 1963 briefing on "Operation Derby Hat,"[47] the Deputy ACSI, DA, directed that no further field testing with EA 1729 be undertaken. The discontinuance was based on a lack of data, inconclusiveness of the testing, and the legal, political, and moral problems inherent in the use of EA 1729.[48]

Summary

(U) ~~(C)~~ In summary, the Intelligence Corps' use of LSD on humans involved 30 to 35 U.S. Army officer and enlisted volunteers receiving repeated doses over a period of nearly two years. The subjects apparently received thorough physical examinations and excellent medical care; the experiments were conducted under competent medical supervision. The first experiment, which involved the surreptitious administration of LSD at a simulated social reception, was in violation of published Department of Defense and Department of the Army policies. There were no records found for the majority of the Intelligence Corps volunteers; the few which were found were incomplete and totally inadequate to determine even the most basic information about the test.

(U) ~~(C)~~ "Operation Third Chance" involved the use of LSD on nine foreign nationals and one U.S. military subject, none of whom were volunteers in any sense of the word.

(U) ~~(C)~~ "Operation Derby Hat" involved the use of seven nonvolunteer foreign nationals and one U.S. military person, who reportedly was a volunteer. Both operations, "Third Chance" and "Derby Hat," were in violation of Department of Defense and Department of the Army policy and regulation and disregarded moral and ethical standards of conduct governing the use of humans in research.

(U) There was no evidence of actual use of LSD on any subjects in South Vietnam. Moreover, there was no indication that LSD was used for any purpose by U.S. Army intelligence agencies after the cessation order of 10 April 1963 by the Deputy Assistant Chief of Staff for Intelligence, Department of the Army.

## FOOTNOTES

## CHAPTER IX

1.(U) ~~(C)~~ U.S. Army Chemical Warfare Laboratories (ACC), MD, Letter to Commanding General, U.S. Army Intelligence Center, Fort Holabird, MD, subject: Proposed Plan for Field Experimentation with EA 1729, dated 19 March 1959.

2.(U) ~~(C)~~ U.S. Army Intelligence Board Letter to Chief, Medical Research Directorate, Chemical Warfare Laboratories, subject: Transmittal of Planning Worksheet, dated 3 June 1958.

3.(U) ~~(C)~~ Testimony of LTC (Ret) William J. Jacobson, 29 August 1975.

4.(U) ~~(C)~~ Disposition Form by a Medical Research Laboratory staff member, subject: Comments on "X" Material Testing Program Proposal from USAINTC, dated 27 March 1958.

5 (U) ~~(C)~~ U.S. Army Intelligence Center, Fort Holabird, Letter to Commanding General, U.S. Army Chemical Center, Edgewood, MD, subject: Material Testing Program EA 1729, dated 28 April 1958.

6. (U) Testimony of MG (Ret) Richard G. Prather of 29 October 1975.

7. (U) Director of Medical Research Laboratories Letter to Commanding General, ACC, and Chemical Corps Materiel Command, subject: Request for Fund Citation, dated 21 October 1959.

8. (U) U.S. Army Chemical Research and Development Laboratories Technical Report CRDL 3074 titled, "Clinical Investigation of EA 1729," published June 1961.

9.(U) ~~(C)~~ U.S. Army Intelligence Board Report, "Unwitting Reaction Tests," dated 14 August 1958.

10.(U) ~~(C)~~ U.S. Army Intelligence Board Report, "Isolation Tests," dated 9 December 1958.

11(U) ~~(C)~~ U.S. Army Intelligence Board Report, "Polygraph Test," dated 21 August 1958.

12(U) ~~(C)~~ President, U.S. Army Intelligence Board, Letter to Chief, Chemical Research Directorate, Edgewood, subject: Transmittal of Planning Worksheet," dated 24 March 1959.

13.(U)~~(C)~~ U.S. Army Intelligence Center Letter to Edgewood Medical Directorate, subject: Report of Experiment, dated 12 November 1959.

14(U)~~(C)~~ U.S. Army Intelligence Board Letter and Memorandum for Record to Army Chemical Center, subject: Report of Experiment, EA 1729, dated 27 April 1960.

15(U)~~(C)~~ U.S. Army Intelligence Board Memorandum, subject: Material Testing Program EA 1729, Phase II Polygraph Test, dated 4 August 1960.

16. (U) Testimony of LTC (Ret) Allan D. Bell, Jr., 8 August 1975.

17. (U) Testimony of MAJ (Ret) Charles L. Shirley, Jr., 5 August 1975.

18. (U) Testimony of Anthony A. Manheim (former enlisted man), 9 September 1975.

19. (U) Testimony of LTC (Ret) Robert R. Rich, 15 August 1975.

20.(U)~~(C)~~ Medical Research Laboratories Letter to Commanding General, U.S. Army Intelligence Center, subject: Material Testing Program EA 1729, approximate date 14 January 1959 (later reference identified letter as 14 January 1959, Memorandum for Record on file copy is dated 5 January 1959).

21. (U) U.S. Army Intelligence Center Letter to Commanding General, U.S. Army Chemical Research and Development Command, Edgewood, subject: Material Testing Program, EA 1729, dated 21 January 1959.

22(U)~~(C)~~ Disposition Form from Director of Medical Research to Commander, U.S. Army Chemical Warfare Laboratories, subject: CIC Test Plan, dated 6 March 1959.

23(U)~~(C)~~ USAINTC Letter to ACSI, DA, subject: Staff Study: Material Testing Program, EA 1729, dated 15 October 1959. (Includes reference to ACSI-SC Letter, 27 July 1959, requesting staff study - reference not found.)

24(U)~~(C)~~ Report of Trip of OACSI Liaison Group re Material Testing Program EA 1729, dated 26 August 1960.

25(U)~~(C)~~ Memorandum from USAINTB project officer to Board President, subject Material Testing Program, EA 1729 re Report of Liaison Trip to USAREUR, dated 30 August 1960.

26(U)~~(C)~~ U.S. Army Chemical Corps R&D Command Letter to Commander, U.S. Army Chemical R&D Laboratories, subject: Material Testing Program, EA 1729, dated 25 January 1961.

(U) a. Inclosure 1. Disposition Form from DSMCI to ACSI, subject: Material Testing Program EA 1729, undated.

(U) b. Inclosure 2. Material Testing Project EA 1729, Phase I Background and Summary to Date, undated.

(U) c. Inclosure 3. Material Testing Project EA 1729, Phase II Field Experimentation Program, undated.

(U) d. Inclosure 4. Fact Sheet by OACSI/ODSMCI/Security Division, subject: Material Testing Program EA 1729, dated 9 December 1960.

(U) e. Inclosure 5. Memorandum for Record, ACSI-SC, dated 21 December 1960.

27 (U) Disposition Form, OACSI, subject: Notification of Briefing for 7 December 1960.

28. (U) Headquarters, Department of the Army, Office ACSI, Letter to Commander, U.S. Army Chemical Corps R&D Laboratory, Edgewood Arsenal, subject: Report of Trip and Activities of the Department of the Army EA 1729, Special Purpose Team, dated 21 September 1961.

29 (U) Project Officer Report to ACSI, subject: Report of Trip and Activities of the Department of the Army EA 1729 Special Purpose Team re: Operation "Third Chance," dated 6 September 1961.

30. (U) Report of Investigation - Loss of Classified Documents from Headquarters, U.S. Army, Europe (Rear), to Commander-in-Chief, U.S. Army, Europe, dated 12 April 1961.

31. (U) DA, TJAG, Washington, DC, file 61/121 (SC 5754), March 1962.

32. (U) The Adjutant General file - Personnel Records.

33. (U) Letter, ACSI-SC, subject: Material Testing Project EA 1729, dated 29 December 1961. (Document not found; reference only.)

34 (U) Memorandum for Record, subject: Policy and Operational Factors Involved in the Conduct of Field Experimentation of EA 1729, dated 1 Ma[illegible]

35 (U) ACSI Letter, subject: Material Testing Program EA 1729, to Chief Chemical Officer, dated 28 March 1962.

36 (U) ~~(C)~~ U.S. Army Chemical Corps Research and Development Command Letter, subject: Material Testing Program EA 1729, dated 6 April 1962.

37. (U) ACSI Letter to USAINTC, subject: Material Testing EA 1729, dated 9 April 1962, with attached Memorandum for Record.

38 (U) ~~(C)~~ ACSI Letter to CG, USAINTC, subject: Material Testing Program EA 1729, dated 7 June 1962.

39 (U) ~~(S)~~ Report on "Derby Hat" Liaison Trip to USARPAC Area, dated 13 July 1962.

40 (U) ~~(S)~~ ACSI-SPT "Derby Hat" Letter Reports:

a. No. 1, dated 17 August 1962.
b. No. 2, dated 29 August 1962.
c. No. 3, dated 7 September 1962.
d. No. 4, dated 16 September 1962.
e. No. 5, dated 22 September 1962.
f. No. 6, dated 8 October 1962.
g. No. 7, dated 12 October 1962.
h. No. 8, dated 28 October 1962.
i. Unnumbered, dated 15 November 1962.

41 (U) ~~(C)~~ Testimony, LTC (Ret) Gordon W. Ross, 20 November 1975.

42 (U) ~~(C)~~ ACSI Memorandum for Chief, DA Special Purpose Team 1729, subject: Material Testing EA 1729, dated 2 August 1962.

43 (U) ~~(S)~~ Testimony of MAJ (Ret) Earnest R. Clovis of 18 November 1975.

44. (U) ACSI Letter to Commander, U.S. Army Chemical R&D Laboratory, Edgewood, subject: Material Testing EA 1729, dated 4 December 1962, with Memorandum for Record, dated 3 December 1962.

45. (U) Message of 5 December 1962 from Camp Drake, Japan, to COMUSACV, Saigon, subject: Special Purpose Team.

46 (U) ~~(C)~~ Memorandum for Chief of Staff from Deputy ACofS for Intelligence, subject: European Report, DA EA 1729 Special Purpose Team, dated 4 February 1963.

47 (U) ~~(C)~~ ACSI, DA, Disposition Form, subject: Notification of Briefing, dated 31 March 1963.

48 (U) ~~(S)~~ ACSI, DA, Memorandum for Record, subject: Material Testing Program EA 1729, dated 12 August 1963.

# CHAPTER X

# CONTRACTS WITH CIVILIAN INSTITUTIONS

## General

The purpose of this chapter is to provide an overview of the contracts awarded to civilian institutions by the U.S. Army Chemical Corps during the period 1950 to 1971 and to briefly discuss the rationale, scope and cost of these contracts. The discussions in this chapter were limited to contracts for which actual contracts or contract progress reports were available.

Contracts with civilian medical, penal and educational institutions were an important and integral part of the Army's Chemical Corps medical research program. The contracts were executed for a wide variety of purposes, ranging from analysis of chemical compounds to the use of volunteers and patients in psychotropic drug experimentation.

Due to the passage of time and the routine records destruction requirements, many of the contracts executed in conjunction with the Chemical Corps medical research program were not located, nor was a determination made as to the actual number of contracts awarded, their cost, or how many volunteers or patients were used by contractors. Although thousands of pages of documents from contracts, contract reports, and conference notes were reviewed, it was recognized that additional information may exist at sources and locations not explored during the research effort. However, the information presented was considered to be based on the most accurate data available.

Available records indicated that the Chemical Corps Medical Research Laboratories entered into numerous contracts with chemical companies, medical schools and hospitals prior to 1950. However, the earliest evidence of a contract or report of a contract relevant to this research effort was dated 18 May 1950. That contract was with the University of Maryland for "Psychological Studies of the Effects of Chemical Warfare Agents." The available reports regarding the contract indicate that human subjects were not involved.[1] In all, 54 contracts or report of contracts were discovered and reviewed during the research effort. The chart at the end of this chapter provides a breakout of 48 of the 54 contracts, to include: contractor, dates of contract, estimated cost, contract number, purpose of contract and the number of volunteers used, as indicated in the available reports. Six contracts for which reports were located were not included on the chart because they did not involve human subjects, drugs, chemical agents or matters related to the research effort. It should be noted, that the contract data, to include contract dates, cost, and number of human subjects, presented in this chapter may differ from similar type data presented elsewhere in this report. This is not to say that one is more accurate or complete than others, rather the difference lies in the sources from which the information was obtained. An example of such a difference can be found in a comparison of the cost figures presented in Chapter XI regarding the contractual costs. The figures for this chapter were derived from contracts and progress reports which were in many cases incomplete; while in Chapter XI the figures were based primarily on accounting records and available procurement reports. Since neither source can substantiate the figures with absolute certainty, it seemed more appropriate to present the figures as they were determined from the various records rather than use a single data source. Additionally, the total number of volunteers actually used by the contractors may be greater than the number reflected on the chart, however, a higher figure could not be supported by the available records.

## Early Contracts

Very little evidence was found regarding contracts or the authority for the Chemical Corps Medical Laboratories to enter into contracts prior to 1953. However, it appeared that authority to enter into contracts was inherent in the missions and responsibilities assigned to the Chemical Corps. That is to say they were assigned the mission for development of "nerve agents" and were permitted to contract for matters related to that mission which could be better accomplished by other agencies. Evidence of this was found in a report of the Medical Committee of the Chemical Corps Advisory Council's 1954 meeting.[2] At that meeting it was pointed out that the Medical Laboratories were having considerable difficulty procuring support for the Entomology Branch to study insecticides and insect repellants. In order to compensate for their lack of expertise in the entomology field, the Laboratories reported that they had contracted with two colleges that were prominent in the field (Johns Hopkins and Tufts). It was also reported at the same meeting that much of the clinical research of the Medical Laboratories was under contract to other colleges, universitites, and hospitals. The list included: Illinois College of Medicine, University of Coloradq, University of Utah, Galesburg State Hospital, Montifiore Hospital, University of Louisiana, University of Pennsylvania, Massachusetts General Hospital, University of Wisconsin, University of Indiana, and Howard University. No other details of those contracts were reported; however, they were presented in a light that indicated each contract provided for a service that the contractors were better qualified to perform than the Medical Laboratories at Edgewood. It was apparently in that light that the New York State Psychiatric Institute was granted the first known contract to conduct research in the psychochemical drug field. In fact, at the "First Psychochemical Conference" (12 May 1954) the principal Research Psychiatrist at New York Psychiatric Institute was introduced as "a pioneer in the field of correlating experimental pharmacology and clinical psychiatry."[3] That institution had recently completed three Chemical Corps contracts to determine psychological effects of psychological chemical agents on human subjects. Those contracts are reflected on the chart at the end of this chapter and were also discussed in a separate report regarding the death of a patient during one of the experiments conducted at the New York State Psychiatric Institute. Experiments conducted under those contracts involved testing of human subjects with derivatives of LSD and mescaline.

## Post-1953 Contractual Efforts

As discussed earlier in this report, centralized approval authority for use of humans in research was initiated in February 1953 with the "Wilson Memorandum." It was apparently the intent, if not the wording, of that and later Department of the Army directives that the principles governing the use of humans be applied to the Army contractual efforts as well as its own experimental research.

That intent was also apparently understood, as evidenced by the first known request for permission to use volunteers in research. The final paragraph of that request from the Medical Research Laboratories (24 July 1953) stated: "Authority is also requested to use volunteer subjects for accomplishing those studies which for various reasons cannot be carried out in these Laboratories."[4] Moreover, the Secretary of the Army noted in his approval of the request that: "Special care and attention will be given to those portions of the approved investigations which are to be accomplished by contract, to insure that the same basic principles and safeguards applicable to Department of the Army laboratories are observed by the contractor."[5]

Of the 54 contracts, for which varying reports were available, there were only 14 actual contracts found. The 14 contracts were initiated after publication of the Army's basic policy for "Use of Volunteers in Research" in 1953 (CS:385) and in each case the contract included provisions to require the contractor to observe the Army policies regarding the use of volunteer subjects. Typical of those provisions was the one included in a 1961 contract with Hahnemann Medical College: "The contractor will be required to adhere fully to the provisions set forth in Appendix A entitled Policy to be Followed by the Contractor Where the Use of Human Subjects is Involved, attached hereto, in the use of any human subject in the work under this contract. The contractor further agrees to obtain prior approval of the Commanding Officer, U.S. Army Chemical R&D Laboratories before commencing any research hereunder on human subjects."[6]

## Nerve Agent Studies

The majority of the contracts reviewed during the inquiry involved studies other than psychochemical drugs in humans. Ten contracts, reflected on the chart, were awarded to four universities for studies of nerve agents and treatment of accidental exposures to nerve agents. Three of the ten contracts were awarded to the University of Colorado School of Medicine for investigation and treatment of nerve agent casualties and evaluation of therapy and antidotes for those casualties. A review of 21 reports submitted by the contractor reflected that 356 accidental nerve agent exposures, which occurred at Rocky Mountain Arsenal, were investigated, treated or evaluated under the terms of those contracts. There was no evidence that the contractor used drugs or volunteers in connection with his work. Two of the contracts were awarded to the University of Utah to study effects of nerve agents on personnel at Dugway Proving Ground, Utah. The two reports available regarding those contracts indicated that the contractor performed experimental research in animals, investigated accidental exposures at Dugway Proving Ground, and provided emergency hospital treatment for Dugway nerve agent casualties prior to the establishment of a military hospital at Dugway. No volunteer work was conducted under the terms of those contracts and drugs used were those recognized in the treatment of nerve gas exposure. Four similar contracts were awarded to Johns Hopkins University. A review of eight reports regarding those contracts revealed that there were three objectives of the contracts. The first was to conduct studies of the electroencephalogram (EEG) as an aid in the evaluation of drugs; no humans were involved in those studies. The second was a study of "parathion spray," a poisonous compound commercially used as an agricultural insecticide. Reports indicated that ten volunteer subjects were employed in those experiments. Each volunteer was reportedly handled in full accord with U.S. Army policy (CS:385). The third objective of the contracts was the investigation of nerve and mustard gas accidental exposures at Edgewood Arsenal; no volunteers or drugs were involved in that portion of the contractual effort. The last of the ten contracts, in the category of nerve agent studies, was awarded to the University of Maryland to investigate minor nerve gas poisoning at the Diamond Alkali Company (location was not stated) in the early 1950s. Available reports of that contract reflected the investigation of 38 accidental exposures to chlorine gas during the course of the contract.

## Incapacitating Agents Contracts

Twelve contractors were awarded a total of 25 contracts for studies or experiments involving incapacitating agents. The agent/drugs used were physical incapacitants such as morphine, demerol, seconal, scopolamine, chlorpromazine, and secobarbital. Mental incapacitants studies included: LSD, mescaline, atropine, psilocybin, BZ (benzilate) and glycolate compounds. The number of incapacitating agent contracts listed here (25) was at variance with the number of contracts reported by the Army General Counsel in his testimony of 8 September 1975[7] and with an earlier report made to the Assistant Secretary of the Army.[8] The difference was a result of obtaining more detailed contract data and an expansion of the number of chemical agents included in the research effort. As mentioned in the foreword, the initial research project was not interpreted to include many of the physical incapacitants or the glycolates, but was restricted to "hallucinogenic compounds" such as LSD and mescaline.

Three of the contracts were with the New York State Psychiatric Institute for studies of LSD and mescaline and were discussed earlier as well as in a separate report. In late 1953, the investigators of that Institute formed a private corporation called "The Research Foundation for Mental Hygiene, Inc." and were awarded two additional contracts to conduct studies with LSD and mescaline type drugs on psychiatric patients. Details regarding the performance of those contracts were not found. Thus, it can not be stated with certitude that the patients used were volunteers or that the policies established by the Army to govern the use of humans in research were adhered to in all cases.

Two of the contracts were awarded to the University of Washington for this study of Neurological action of CW agents. Review of 21 reports regarding those contracts indicated the investigators established a volunteer pool of 35 medical students of which at least 19 were used in psychochemical drug experiments. The reports stated that all Army policies were observed by the investigators, to include complete mental and physical examinations. The studies conducted under the University of Washington contracts included the use of both male and female humans in testing LSM (lysergic acid morpholide), an LSD-like compound, LSD, and psilocybin.

Two of the contracts were awarded to the University of Maryland to perform clinical and laboratory studies of effects of a series of atropine substitutes, other candidate therapeutic agents and chemical warfare agents. Five available contract reports and contractors conference notes[9] reflected that experiments were conducted using military volunteers from Edgewood Arsenal as well as patients from the University of Maryland Psychiatric Institute and area hospitals and perhaps other volunteers. The studies included testing of 20 male college graduates' ability to operate an Air Force dual-pursuit apparatus while under the influence of LSD; 16 subjects were tested with LSD on the "Wechsler Memory Scale"; and 24 subjects were given LSD to test their sense of time. Others reportedly were given tests to determine the ability of dibenzyline (a blocking agent) to attenuate the effects of LSD. Available evidence indicated that all policies regarding the use of volunteer subjects were observed.

One of the contracts was awarded in 1961 to North American Aviation's Medical Department to test "Aircraft Performance Decrement Resulting from Ingestion of BZ." Two reports regarding that contract stated that 19 company employees volunteered as subjects in the experiment. The reports also stated that each volunteer was given a complete medical examination and was required to sign an individual volunteer agreement before taking part in the tests.

One contract was awarded to the Indiana University in 1951 for the purpose of studying "The Physiological Effects of Atropine and Potential Atropine Substitutes." The seven reports regarding that contract did not reveal any information regarding screening or selection of volunteers. The absence of such details was not unusual as the contract predates publication of DOD and Army policies governing use of volunteers in medical research. The studies apparently dealt primarily with chemical research. However, there was evidence of seven volunteers used in atropine studies.

Six separate contracts were awarded to the University of Pennsylvania. The initial contract (1951) was for "Study of Chemical Warfare Casualties in Man." Reports of that contract indicated that volunteers were not used and the principal effort was chemical research with one exception. On one occasion, six firemen were accidently exposed to an unknown substance, and that exposure was reportedly investigated under the terms of that contract. The second contract was a study of "Influence of Morphine and Demerol on the Respiratory Response of Man". Review of eight progress reports available regarding that contract revealed that approximately 40 volunteers were used in conjunction with morphine and demerol drug tests. The reports did not reveal the source of those volunteers or any evidence regarding the screening, selection, or execution of volunteer agreements.

The third and fourth contracts involved the "Evaluation in Animals and Man, Drug and Drug Mixtures Intended for use in Preventing or Treating CW Casualties." The four reports available regarding these contracts indicated that 10 volunteers received scopolamine, atropine, and morphine. Again, no evidence was found to reflect the source of volunteers or other matters concerning selection and medical preparations that preceded the use of volunteers.

The fifth and sixth contracts were awarded in the mid and late 1960s to conduct experiments of "Threshold Doses in Humans and Evaluation of Drugs in Man." Review of 55 progress reports revealed that approximately 320 inmates at Holmesburg Prison were tested with 16 different chemical agents including ditan, atropine, scopolamine and various experimental glycolate agents.

Since glycolates have not been previously described in this report, a brief description is provided at this point. "The glycolates cause incapacitation by interfering with muscarinic functions (i.e., activation of smooth muscle and secretory glands) and the central nervous system functions of acetylcoline; they depress or inhibit nervous activity. In addition to delirium, there is physical incoordination, blurred vision, inhibition of sweating and salivation, rapid heart rate, elevated blood pressure, increased body temperature, and, at high doses, vomiting, prostration, and stupor or coma. The onset time may be minutes or hours, depending on the structure of the compound, and the duration, hours or days. The effects may be reversed almost completely by treatment with physostigmine or other centrally active cholinesterase inhibitors such as VX."[13]

The largest dollar value contract (DA 18-035-AMC-126(A)) of the six awarded to the University of Pennsylvania was different than any of the previous contracts with the other universities. In fact, the records and reports indicated that there were three major differences. First, it was the first known contract that the Medical Research Laboratories entered into involving prison inmates. Secondly, it was the first indication found that the contract investigators may not have been fully prepared to conduct experiments with humans at the outset of the program. Finally, the records of the execution of that contract indicated that one of the purposes of the contract was to allow military medical investigators to conduct experiments using prison inmates as their subjects. Indications of the unpreparedness of the contractors medical investigators was reflected in a 5 November 1964 report of a visit by the Chemical Corps Medical Contract Project Officer, Edgewood Arsenal, to the contractors' facilities. That report held that: "Throughout the entire three-day period, testing was hampered by equipment, such as needles, syringes, and alcohol sponges, not being readily available. On the second day of testing no medical personnel, other than ourselves, were present, not did any appear, or make contact with us prior to our leaving Friday afternoon." The report also stated: "It is our opinion that in order for this program to be successful, there needs to be guidance and supervision of the testing by the contractors. This is especially important in this early stage of the program for training of the nursing personnel and establishing standard operating procedures."[10] Another report of a visit by the Edgewood Arsenal Project Officer to Holmesburg Prison in March 1966, held that the competence of the contractor staff and facilities were adequate, thus, indicating that improvements had been made in the one and a half years between the reported visits. However, that report cited proof of the third point mentioned above, i.e., medical investigators from Edgewood were conducting experiments on prison inmates. This report stated that the purpose of the visit was twofold: first; the introduction of new military medical investigators; and secondly, "to conduct a supervised experiment involving high doses of an incapacitating agent to determine the capability of the contractor to assume responsibility for experiments of this type."[11]

The concern that the contract was used as a means to provide subjects for use by Edgewood Arsenal medical personnel was presented to the Edgewood Arsenal legal advisor by the contracting officer in October 1966. The legal counsel ruled that "the contract cannot be treated as one merely to provide subjects for the use of Edgewood medical personnel."[14] Later in October 1966, the contracting officer met with the Chief of Medical Research Laboratory and the contract project officer and reached an understanding that the contractor had been and would, in the future, be allowed and required to assume full responsibility for the work conducted under the terms of the contract. Although this agreement appeared to indicate that Army medical investigators had not taken part in either actual experiments or in direct supervision of experiments on inmates, available evidence indicated that as late as 1964, experiments on prison inmates at Holmesburg Prison were personally conducted or supervised by military medical investigators.

The same civilian medical investigators who conducted research at Holmesburg Prison under University of Pennsylvania contracts formed the Ivy Research Laboratories, Inc. That organization received two contracts (one in 1968 and the other in 1970) from the Chemical Corps to continue work at Holmesburg Prison with inmate volunteers.[15] The purpose of these contracts was to determine the threshold response dose of adult human subjects to various chemical agents furnished by the Medical Research Laboratories at Edgewood. The chemical agents investigated were: choking agents, nerve agents, blood agents, blister agents, vomiting agents, incapacitating agents, and toxins.[16] The 21 progress reports regarding these contracts indicated that at least 94 inmates were used in experiments. In addition to the reports, one actual contract was found. Review of that contract indicated the contractor was required to comply with Department of the Army policies established by AR 70-25 (Use of Volunteers in Research). There was no evidence that the investigators at Holmesburg failed to comply with any of the policies set forth in the Army regulation.

The completion of the Ivy Research contracts was delayed in February 1971 when the inmates filed a civil suit concerning the conditions at the prison. Although the records indicated that the medical research was not an element of the complaint, the work was stopped until the suit was settled. Nine months later preparations were made to continue the volunteer experiments. However, in March 1972, a fire within the prison damaged facilities and equipment located on the prison grounds which belonged to the prison, Ivy Research Laboratories and the Army. Because of the fire and of criticism of Ivy Research by the Prison Board, the contract was terminated in February 1973. No work on volunteers had been done since February 1971.[17]

One of the contracts was awarded to American Institute for Research, Silver Spring, MD in 1964. The objective of the contract was to develop a comprehensive test battery to measure the effects of incapacitating agents on the abilities basic to performance of militarily relevant tasks. Review of seven reports available regarding the contract indicated that the American Institute investigators conducted psychoactive chemical compound experiments on military volunteers. It was not clear from the reports if the volunteers came from Edgewood Arsenal or elsewhere or if the experiments were conducted at Edgewood Arsenal. Moreover, the only agent mentioned in the reports was EA 3580, a glycolate. Other studies conducted under the terms of the contract appeared to focus on academic type testing to determine the validity of the screening and selection process used to determine which military volunteers were eligible to receive psychochemical drugs.

In 1955 an Army grant (DA18-108-CML-5596) was provided to Tulane University, Department of Psychiatry and Neurology, for research in abnormal brain functioning as related to mental illness. The few Army records available regarding the experiments conducted under the terms of the Army grant revealed that mental patients, normal volunteers and neurological patients were used by the Tulane medical investigators. The actual terms of the grant were not found and therefore no determination was made concerning the grantees' compliance with Department of the Army policies nor could any judgment be made as to the quality of consent rendered by the patients. One particular experiment involved giving LSD and mescaline to mental patients who previously had wire electrodes implanted in their brains. Reports indicated that the research group believed that a basic biochemical abnormality was responsible for the bizarre behavior demonstrated by many psychotic patients; and that the wire electrodes served a twofold purpose: to record electrical abnormalities in patients' brains, and to stimulate patients brains in hope of curing or ameliorating the patients' problem. The reports suggested that the implantation of electrodes was financed under a grant from the Commonwealth Foundation and not the Army grant. Finally, it was not clear what the Chemical Corps interests in the experiments were at the time, although, it was surmised that their interest did not go beyond gathering evidence of the effects of LSD and mescaline in humans. Some credence was lent to that belief by the reports provided the Chemical Corps, which did not discuss the implantation procedures, purpose or effect; rather they stressed the effects of the drugs.[18]

Three contracts were awarded Baylor University for experiments with physical incapacitating agents in human subjects. The five reports concerning the contracts established that the volunteers were screened, selected and medically examined in accordance with Army policy directives. The experiments involved the use of adult volunteers of both sexes with therapeutic drugs such as demerol, morphine and scopolamine.

One of the contracts involving physical incapacitating agents was awarded to the Institute for Behavioral Research to study "Drug effects and complex behavioral repertories under conditions of full environmental control." Experiments under that contract primarily involved monkeys and baboons. However, there was evidence of some volunteer experiments with sedatives or tranquilizers such as seconal, dimethyl tryptamine and chlorpromazine.

The remainder of the contracts were not involved in psychochemical drug studies. Mount Sinai Hospital was awarded four contracts to conduct studies of patients with hypothalamic diseases; neither drugs nor volunteers were involved. Louisiana State University was awarded two contracts to conduct studies of poisoning and effects of organic phosphate insecticides in man and animals. Those studies involved the investigation of accidental exposures and did not include the use of drugs or volunteers. The Maryland Medical-Legal Foundation was awarded a contract to study cases of botulism intoxication throughout the country. They collected data and apparently paid victims (called volunteers in their reports) for blood samples. Hahnemann Medical College and Hospital was awarded four different contracts for evaluation of blocking agents (chemical compound used to attenuate the effects of drugs or chemical agents). They used volunteer subjects extensively; progress reports reflected that they used no coercion or enticement to gain volunteers and followed stringent medical safeguards in every human test. New York University was awarded two contracts which involved collection of data on patients with endocrinalogic disorders (disorder of the glands). No drugs or volunteers were involved in those studies.

The data upon which this chapter was based was found in various Army files; no effort was made to search the contractors files or to request the contractors assistance in contributing data that may have been available in their files. Moreover, research for this chapter did not include contracts with chemical companies or laboratories for the development, synthesis or procurement of chemical compounds or equipment.

Finally, with the exception of the Holmesburg Prison inmates and an occasional mention in contract reports, the names of volunteer subjects or patients were not disclosed in the records and reports researched during [illegible] inqui[illegible].

## Recapitulation of Contract Data

In summary, 54 contracts or progress reports of contracts, were reviewed as a basis for this portion of the report. Those contracts are categorized below.

| Category | Nr. of Contractors | Nr. of Contracts |
|---|---|---|
| Unrelated to Incapacitating Agent Research[1] | 6 | 6 |
| Nerve Agent Studies (N)[2] | 4 | 10 |
| Incapacitating Agent Contracts (I)[2] | 12 | 25 |
| Miscellaneous Research Studies (M)[2] | 5 | 13 |
|  | 27 | 54 |

1 = Not included on Contract Chart
2 = ( ) Category of research, listed at Column 8 of Contract Chart

# CONTRACT CHART

| CONTRACTOR | DATES<br>START | <br>END | COST | CONTRACT NR. | PURPOSE OF CONTRACT | NR. OF VOLUNTEERS | CATEGOI CONTRAC. |
|---|---|---|---|---|---|---|---|
| 1. American Inst. for Research | 07/01/64 | 10/23/67 | $192,096 | DA18-035-AMC-282(A) | Develop tests to measure affects of incapacitating agents | 102 | I |
| 2. Baylor University | 10/01/61 | 09/30/62 | 6,552 | DA-CML.-18-C-36 | Study effects of Analgesic drugs on respiratory center and circulation in humans | 31 | I |
| 3. " " | 1964 | 1967 | 44,000 | DA18-108-AMC-149(A) | | Unk. | I |
| 4. " " | 06/02/65 | 06/30/68 | 44,000 | DA18-035-AMC-397(A) | | 18 | I |
| 5. Hahnemann Medical College | 06/26/61 | 07/31/66 | 277,863 | DA18-108-CML-6623(A) | Evaluation of Therapeutic Compounds in animals and humans | None | H |
| 6. " " " | 05/24/67 | 04/24/68 | 50,060 | DAAA15-67-C-0489 | | 65 | H |
| 7. " " " | 06/11/68 | 12/11/68 | 25,000 | DAAA-1567-C-0489-0641-0295 | | 26 | H |
| 8. " " " | 01/06/69 | 03/06/70 | 49,775 | DAAA15-69-C-0295 | | 26 | H |
| 9. Inst. for Behavioral Research | 10/01/62 | 12/31/65 | 156,681 | DA18-108-AMC-26(A) | Drug Effects and Complex behavioral repertories | 10 | I |
| 10. Indiana University | 06/51 | 09/53 | Unk. | DA18-108-CML.-2397 | The Physiological effects of Atropine & Atropine Substitutes | 7 | I |
| 11. Ivy Research Labs., Inc. | 06/28/68 | 12/01/69 | 78,135 | DAAA-15-68-C-0627 | To determine threshold dose effects in man | 94 | I |
| 12. " " " " | 03/70 | 09/71 | 48,700 | DAAA-15-68-C-0324 | | Unk. | I |

| CONTRACTOR | DATE<br>START | <br>END | COST | CONTRACT NR. | PURPOSE OF CONTRACT | NR. OF VOLUNTEERS | CATEGORY CONTR |
|---|---|---|---|---|---|---|---|
| 13. Johns Hopkins Univ. | 02/25/60 | 07/14/65 | $ 91,115 | DA18-108-405-CML.-704(A) | Determine effects of drugs and CW agents on the EEG | None | H |
| 14. " " " | | | | DA18-108-CML.-6609(A) | | Unk. | H |
| 15. " " " | 11/19/51 | 01/31/55 | 152,525 | DA18-108-CML-3014 | Treatment of injury by GB and mustard effects | 10 | H |
| 16. " " " | 02/01/55 | 02/25/60 | 18,000 | DA18-108-405-CML.-704 | Studies on EEG Method to aid in evaluation of drugs | None | H |
| 17. Louisiana State Univ. | 05/21/54 | 07/31/58 | 51,452 | DA18-108-405-CML-37 | Clinical Pathological and Pathophysiological studies in anticholinesterase poisoning | Unk. | H |
| 18. " " " | 07/01/55 | 07/31/58 | | DA18-108-CML-5473 | | None | H |
| 19. Maryland Medical-Legal Foundation | 10/11/63 | 09/07/66 | 149,530 | DA18-035-AMC-102(A) | Search for new Incapacitating Agents | None | H |
| 20. Mount Sinai Hospital | 07/01/64 | 09/30/66 | 37,064 | DA18-035-AMC-281(A) | Hypothalamic Control of Adrenocortical Function | None | H |
| 21. " " " | 06/01/63 | 04/31/64 | 24,378 | DA18-108-AMC-147(A) | | None | H |
| 22. " " " | 12/12/67 | 12/11/69 | 34,022 | DAAA15-68-C-0244 | | None | H |
| 23. " " " | 11/17/66 | 11/16/67 | 20,900 | DAAA15-67C-0189 | | 22 | H |
| 24. North American Aviation | 09/25/61 | 06/15/62 | 51,840 | DA18-108-CML-6644 | Pilot Performance tests with BZ | 18 | I |
| 25. New York State Psychiatric Institute | 10/09/51 | 02/28/53 | 19,807 | DA18-108-CML-2913 | Determine psychological effects of psychological chemical agents on human subjects | Unk. | I |

| CONTRACTOR | DATES<br>START | END | COST | CONTRACT NR. | PURPOSE OF CONTRACT | NR. OF VOLUNTEERS | CATEGORY CONTRACT |
|---|---|---|---|---|---|---|---|
| 26. N.Y. State Psychiatric Inst. | 10/09/51 | 02/28/53 | $ 12,444 | DA18-108-CML.-2914 | Determine psychological effects of psychological chemical agents on human subjects | 8 | I |
| 27. " " " " | 03/19/53 | 03/10/54 | 11,832 | DA18-108-CML-4915 | | 6 | I |
| 28. New York University | 07/01/63 | 06/30/64 | 10,550 | DA18-108-AMC-187(A) | Endocrinologic effects of altered consciousness | None | H |
| 29. " " " | 08/01/64 | 07/31/66 | 30,480 | DA18-035-AMC-304(A) | | Unk. | H |
| 30. Research Foundation for Mental Hygiene, Inc. | 12/53 | 09/30/57 | 142,739 | DA18-108-CML.-5198 | Psychiatric and Therapeutic studies of compounds | 12 | I |
| 31. Research Foundation for Mental Hygiene, Inc. | 09/57 | 09/59 | 25,000 | DA18-108-405-CML-49 | Mental behavior of human with certain agents | 65 | I |
| 32. Tulane University | 1955 | Unk. | 53,795 | DA18-108-CML.-5596 | Study behavior during administration, LSD-25, & mescaline | 6 | I |
| 33. Univ. of Colorado | 06/51 | 09/54 | 64,295 | DA18-108-CML-2412 | Investigation and testing of nerve agent casualties; evaluation of therapy and antidotes | None | H |
| 34. " " " | 09/21/54 | 09/30/58 | 74,736 | DA18-108-CML.-5586 | | None | H |
| 35. " " " | 09/01/58 | 03/31/61 | 36,542 | DA18-108-405-CML.-264 | | None | H |
| 36. Univ. of Maryland | 05/18/50 | 06/30/54 | 114,605 | DA18-108-CML-632 | Psychological Studies of effects of CW agents; candidate therapeutic agents and CW agents effects on humans | None | H |

| CONTRACTOR | DATES START | END | COST | CONTRACT NR. | PURPOSE OF CONTRACT | NR. OF VOLUNTEERS | CATEGORY CONTRA |
|---|---|---|---|---|---|---|---|
| 37. Univ. of Maryland | 06/06/54 | 06/30/57 | $ 63,178 | DA18-108-CML-5519 | | Unk. | I |
| 38. " " " | 03/14/57 | 08/31/60 | 89,897 | DA18-108-CML-6337 | | 117 | I |
| 39. Univ. of Pennsylvania | 04/15/51 | 07/01/55 | 98,894 | DA18-108-CML-2212 | Study of CW casualties in man | None | I |
| 40. " " " | 07/01/55 | 04/60 | 75,029 | DA18-108-CML-5752 | Research of chemicals and CW casualties in man | 40 | I |
| 41. " " " | 12/15/61 | 12/14/62 | 14,990 | DA-CML-18-108-G-46 | Experimental basis for treating CW casualties | None | I |
| 42. " " " | 06/01/63 | 09/30/66 | 59,135 | DA18-108-AMC-143(A) | Evaluation of drugs in man | 10 | I |
| 43. " " " | 03/01/64 | 03/31/67 | 326,840 | DA18-035-AMC-126(A) | Threshold doses in humans | 320 | I |
| 44. " " " | 11/66 | 12/68 | 37,800 | DAAA-15-67-C-0154 | Evaluation of drugs in man | Unk. | I |
| 45. University of Utah | 04/03/54 | 08/31/57 | 37,873 | DA18-108-CML-5421 | Study effects of CW agents as personnel hazard | 40 | II |
| 46. " " " | 09/05/57 | 07/31/59 | 25,000 | DA18-108-405-CML-60 | Therapeutic effects of chemical compounds | 2 | II |
| 47. Univ. of Washington | 04/10/57 | 11/30/62 | 221,529 | DA18-108-405-CML-6364 | Neurological Action of CW Agents | 19 | I |
| 48. " " " | | | | DA18-108-405-CML-79 | | Unk. | I |
| | | | | | Estimated Total | 1074 | |

## FOOTNOTES

## CHAPTER X

1. Contract, DA 18-108-CML-632, University of Maryland, 18 May 1950.

2. Report of Medical Committee, Chemical Corps Advisory Counsel, held on 30 September and 1 October 1954.

3. Chemical Corps Medical Laboratories, Special Report (MSLR No. 71) First Psychochemical Conference, held on 12 May 1954.

4. Chemical Corps Medical Laboratories, Letter, subject: Use of Volunteers in Research, dated 24 July 1953.

5. Secretary of the Army Memorandum, subject: Use of Volunteers in Research, dated 5 November 1953.

6. Hahnemann Medical College and Hospital, Philadelphia, PA, Contract, DA 18-108-CML-7723(A), dated 26 June 1961.

7. Statement by Charles D. Ablard, Army General Counsel, before Investigations Subcommittee, House Armed Services, dated 8 September 1975.

8. Memorandum for ASA (R&D), subject: Senate Select Committee Discussion - Information Memorandum, from TIG.

9. CRDL TM 22-13 Report of February 1957.

10. Edgewood Arsenal Report of 10 November 1964, subject: Report on Trip to Holmesburg City Prison on 5 November 1964 to begin Practice Drug Testing on Prisoner Volunteers.

11. Medical Research Laboratory Memorandum, subject: Report of Visit to Holmesburg Prison, Holmesburg, PA, dated 24 March 1966. Report of Treatment, dated 28 March 1966 attached.

12. Medical Research Laboratory Report, subject: Visit to Contractor, Contract, DA 18-035-AMC-126(A), University of Pennsylvania, dated 10 May 1966, 20 May 1966, 24 May 1966, 11 October 1966, and 26 October 1966.

13. Edgewood Arsenal Technical Report, EATR 4210, The Search for Toxic Chemical Agents, November 1969, page 139.

14. Edgewood Arsenal Counsel Disposition Form, subject: Contract, DA 18-035-AMC-126(A), dated 11 October 1966, attached Memorandum for Record, dated 26 October 1966.

15. Medical Research of Chemical Compounds Fact Sheet #2, Army-LSD Research and Other Chemical Classes, dated 21 July 1975.

16. Contract, DAAA 15-70-C-0324, to Ivy Research Laboratories, Inc., for Threshold Doeses in Humans Annex 1: Listing of Toxic Chemical Agents.

17. Edgewood Arsenal Letter to Director of Procurement, subject: Ivy Research Laboratories, Inc. Contract, DAAA 15-70-C-0324, dated 9 February 1973.

18. Department of the Army, Office of The Surgeon General Memorandum, subject: Review of Reports on Department of the Army Grant, DA 18-108-CML 5596, to the Department of Psychiatry and Neurology, Tulane University, 1955-59 - Information Memorandum, dated 22 August 1975.

19. Edgewood Arsenal Special Publication EASP 1800-2, Chemical Agents in DOD Contracts, dated February 1972.

# CHAPTER XI

# INCAPACITATING AGENTS

## COST REVIEW

### General

The initial letter of instruction of 21 July 1975 directed that The Inspector General determine the cost of the U.S. Army's participation in projects and programs concerning the testing of hallucinogenic drugs. It also required that a determination be made of the total cost of operation of the Special Operations Division at Fort Detrick, MD.[1] The total cost of the Special Operations Division was prepared and submitted separately.[7]

### Initial Financial Study

In July 1975, the Commander of Edgewood Arsenal, at the request of the Office of The Inspector General, directed a study be conducted to determine the expenditures relating to incapacitating agent studies during the period 1950–1975. Investigators from The Inspector General's office and Edgewood Arsenal comptroller personnel agreed to limit the parameters of the study to expenditures related to the Human Volunteer Program. Thus, the study objectives were the recapitulation of the monies expended in basic research and exploratory development of incapacitating agents with particular emphasis on the research leading to and followed in the clinical investigation of incapacitants in man.[2]

On 8 September 1975, the Commander, Edgewood Arsenal, submitted the results of his study to the Office of The Inspector General. He reported that: "The figures presented represent the closest approximation available of the total effort expended, for the official record prior to FY 1968 were destroyed as required by AR 340-18-3."[2] The results of that study are at Sections 1 through 4.

The data contained in the study was validated by Edgewood Arsenal comptroller personnel. This data was assimilated by personnel in the Chemical and Biomedical Laboratories. It is the opinion of the Inspectors General, who reviewed the study and the data upon which the report was based, and interviewed technical personnel that contributed to the study, that this data was provided by technical personnel most knowledgeable of and experienced in the program.[3] Finally, an Inspector General and a member of the Army Audit Agency performed an audit of the costs data submitted for the incapacitating agent program at Edgewood Arsenal.[4] The study reflected that during the 25-year period the search for and study of incapacitating agents, both "in-house" (at Edgewood) and through contractual work, cost 77.4 million dollars. (Refer to Sections 1-4.)

Follow-up Financial Study

During the course of the research effort, the Inspectors General became aware of information which indicated that the parameters established for the first financial study may have been too restrictive. The concern was that other factors associated with, but not part of, the development of incapacitating agents may have been far more costly than the actual incapacitating agent program.[5] Accordingly, the Commander, Edgewood Arsenal was requested to conduct an expanded and less restrictive financial study. In order to expedite the second study, the time period was narrowed to the years which other evidence indicated incapacitating agent development was the most prolific, 1961-1970. Additionally, the parameters for the second study were greatly expanded by comparison with the previous study. The later study included two additional classes of drugs (benzilates and glycolates); it also included engineering laboratory work in the dissemination process, alarm systems, detection methods, development and manufacturing methods technology; and the construction of facilities at Edgewood Arsenal. Additionally, it included construction and field testing at Dugway Proving Ground, and development, production and storage facilities costs at Pine Bluff Arsenal. On 15 January 1976, the Comptroller, Edgewood Arsenal, provided the results of the second study. Again, the report, which is at Section 5, noted the difficulty in locating accurate records in many cases. Nevertheless, the best evidence available provided that the costs associated with the research, development, procurement, manufacturing, and storage of chemical incapacitating agents during the 1961-1970 period was increased by approximately 26 million dollars when viewed from the broadest possible parameters. Considering the increase for the 10 years of the second study, the 25-year cost was increased from 77.4 million to 103.9 million dollars.

However, to establish a final estimate of the total cost of the incapacitating agent program for the entire 25-year period, an adjustment to the 15 years not covered in the second study seemed necessary. To avoid a lengthy study, the additional cost adjustment to year groups 1950-1960 and 1971-1975 was estimated. The method for determining the adjusted cost for the years not included in the second study was as follows: The 10 years covered in the second study (Section 5) established that cost increases ranged from 84% in 1963 to 17.6% in 1969; the average increase for the 10 year period was 38.7%. Applying the 10 year average increase to the 15 years covered only in the initial study, provided an additional 6.534 million dollars estimated to have been spent on the incapacitating agent program.

In summary, an initial study conducted in July-September 1975 was confined to the determination of costs related to basic research and exploratory development of incapacitating agents and produced an estimated cost of 77.4 million dollars for a 25 year period. A second study was conducted in December 1975 and January 1976 to determine the cost of factors such as production, storage and facility construction that were excluded from the initial study. The second study considered only 10 of the 25 years covered in the first report. As a result of the second study, the total cost of the program was increased by 26.5 million dollars to make the estimated total 103.9 million dollars. The annual cost of the years not considered in the second study were adjusted upward by extrapolating the average annual increase (38.7%) reported for the years considered in the second study. The estimated cost for the period 1950-1960 and 1971-1975 (Section 1) of 16.906 million dollars was increased by the average adjustment of 38.7% to provide an additional cost of 6.534 million dollars.

| | |
|---|---|
| STUDY NR. 1 (Sections 1-4) | -$ 77,404,449 |
| STUDY NR. 2 (Section 5) | 26,517,000 |
| Extrapolated costs for 15 years not considered in Study NR. 2 | 6,534,000 |
| TOTAL estimated cost of Incapacitating Program, 1950-1975 | $110,455,449 |

## FOOTNOTES

## CHAPTER XI

1. Office, Chief of Staff, Department of Army, Letter to The Inspector General and Auditor General, subject: Letter of Instruction, dated 21 July 1975.

2. Commander, Edgewood Arsenal, Letter to U.S. Army Inspector General Agency, subject: Financial Data on Incapacitating Agents, dated 8 September 1975.

3. Memorandum of 8 September 1975, by COL Lewis Wright, DAIG-IN, regarding cost of incapacitating agent program at Edgewood Arsenal, 1950-1975.

4. Memorandum for Record, subject: Validation of Edgewood Arsenal Cost Data, dated 8 September 1975.

5. Memorandum for Record, 7 November 1975, regarding estimated cost of incapacitating program during the 1961-1967 time period.

6. Office of The Inspector General Letter to Commander, Edgewood Arsenal, subject: Request for Information Regarding Medical Volunteer Program, dated 9 December 1975.

7. The Inspector General and Auditor General Memorandum for, Special Assistant to the General Counsel, Department of Defense, subject: Cost of Operation of Special Operations Division, Fort Detrick, MD - Information Memorandum, dated 12 September 1975, with inclosures.

# SECTION I

# SUMMARY OF COSTS

6 6 6

# SUMMARY OF INCAPACITATION PROGRAM

## 1950 - 1975

| FISCAL YEAR | GRAND TOTAL | BIOMEDICAL LABORATORY TOTAL PROG | BIOMEDICAL LABORATORY INCAP IN-HOUSE | BIOMEDICAL LABORATORY CONTRACTS | CHEMICAL LABORATORY TOTAL PROG | CHEMICAL LABORATORY INCAP IN-HOUSE | CHEMICAL LABORATORY CONTRACTS |
|---|---|---|---|---|---|---|---|
| 1950 | $ 10,000 | | | | $ 10,000 | 10,000 | |
| 1951 | 10,000 | | | | 10,000 | 10,000 | |
| 1952 | 159,084 | $ 44,084 | | 44,084 | 115,000 | 15,000 | 100,000 |
| 1953 | 95,000 | 80,000 | 80,000 | | 15,000 | 15,000 | |
| 1954 | 277,077 | 262,077 | 161,000 | 101,077 | 15,000 | 15,000 | |
| 1955 | 165,005 | 145,005 | 72,800 | 72,205 | 20,000 | 20,000 | |
| 1956 | 311,830 | 150,830 | 81,500 | 69,330 | 161,000 | 161,000 | |
| 1957 | 485,350 | 195,350 | 98,000 | 97,350 | 290,000 | 290,000 | |
| 1958 | 870,045 | 460,045 | 295,100 | 164,945 | 410,000 | 392,000 | 18,000 |
| 1959 | 826,168 | 301,200 | 261,200 | 40,000 | 524,968 | 471,600 | 53,368 |
| 1960 | 2,814,005 | 1,593,965 | 1,150,400 | 443,565 | 1,220,040 | 1,040,400 | 179,640 |
| 1961 | 3,571,013 | 2,671,000 | 2,048,100 | 622,900 | 900,013 | 473,200 | 426,813 |
| 1962 | 5,309,736 | 2,699,915 | 1,927,500 | 772,415 | 2,609,821 | 1,917,600 | 692,221 |
| 1963 | 8,798,825 | 5,040,805 | 3,272,500 | 1,768,305 | 3,758,020 | 1,790,700 | 1,967,320 |
| 1964 | 10,586,309 | 6,176,233 | 3,695,000 | 2,481,233 | 4,410,076 | 1,073,000 | 3,337,076 |
| 1965 | 10,294,138 | 6,482,094 | 4,919,300 | 1,562,794 | 3,812,044 | 1,003,700 | 2,808,344 |
| 1966 | 7,366,985 | 3,067,024 | 2,692,700 | 374,324 | 4,299,961 | 771,600 | 3,528,361 |
| 1967 | 4,075,061 | 2,425,032 | 2,175,200 | 249,832 | 1,650,029 | 887,700 | 762,329 |
| 1968 | 3,497,692 | 2,147,698 | 2,012,500 | 135,198 | 1,349,994 | 741,200 | 608,794 |
| 1969 | 3,447,026 | 2,447,017 | 2,402,300 | 44,717 | 1,000,009 | 762,300 | 237,709 |
| 1970 | 3,551,200 | 2,334,200 | 2,201,200 | 133,000 | 1,217,000 | 1,217,000 | |
| 1971 | 2,983,500 | 2,308,500 | 2,308,500 | | 675,000 | 675,000 | |
| 1972 | 2,716,500 | 2,031,500 | 2,031,500 | | 685,000 | 685,000 | |
| 1973 | 1,972,700 | 1,517,700 | 1,517,700 | | 455,000 | 455,000 | |
| " 74 | 1,829,200 | 1,324,200 | 1,324,200 | | 505,000 | 505,000 | |
| 1975 | 1,380,000 | 1,045,000 | 1,045,000 | | 335,000 | 335,000 | |
| | $77,403,449 | 46,950,474 | 37,773,200 | 9,177,274 | $30,452,975 | 15,733,000 | 14,719,975 |

| | |
|---|---|
| TOTAL INCAP PROG* | $77,937,583 |
| TOTAL INCAP IN-HOUSE* | 54,040,334 |
| TOTAL INCAP CONTR | 23,897,249 |

*Incl $150,000 for Dissemination & Process Tech (Ref notes on Pg 2), $76,300. For Bldg cost (Ref notes on Pg 3) and $307,8
for overhead for FY's 1950 through 1956 (Ref notes on Pg 4).

SAREA-CC-PB                                                  3 Sep 1975

MEMORANDUM FOR RECORD

Meeting - 3 Sep 1975

SUBJECT: Dissemination and Process Technology in Relation to Incapacitation

ATTENDEES - Dr. Shanty, Dr. Berger, Mr. Treglia, Dr. J. Stevens, Mr. T. Gunther, Mr. N. Capaso, CPT Close and M. Kiefer

1. The referenced meeting was held to determine if the input developed for Dissemination and Process Technology had been confined to the program expenditures up to clinical investigation in man. For clarification, the following criteria were reviewed by each participant, and discussed via FONECON with Dr. McNamara.

a. For Dissemination, estimate only the amount of funds expended to develop dissemination techniques for dispersing incap agents into test chambers for use in animal and man exposures. Do not include work to investigate dissemination methods applicable to weapons systems.

b. For Process Technology, estimate only the amount of funds expended to produce sufficient quantities of candidate agents for use in animal test and human exposures. Do not include process development work intended for establishing production methods.

2. It was agreed that the best estimate for Dissemination and Process Technology, within the definition stated, over a 25 year period was $100,000 to $150,000.

## BIOMED LAB
## INCAPACITATING AGENTS PROGRAM RECONSTRUCTION; 1950 - 75

John R. Wood, Building E3100

### Method of Determining Construction Costs Applicable to the Incapacitating Agents Program

By comparing the area of the building devoted to the volunteer progra and the incapacitating agents program with the total area of the building it was determined that only 20% of the total area was applicable. It was estimated that since the building was dedicated, 1968, only about 50% of the total volunteers had been utilized on the incapacitating agents program. Thus, only 10% of the building could be construed as being within the program. Assuming that the building has a useful life of 30 years and an initial cost of $3,275,400, the cost per year for the building is $109,000; that portion for the incapacitating agents program is $10,900 per year. For the 7 years in which the building has been used the total cost is $76,300.

Formula:

$$\frac{\text{Incapacitating Area}}{\text{Total Area}} \times \frac{\text{Incapacitating Volunteers}}{\text{Total Volunteers}} \times \frac{\text{Total Cost}}{\text{Useful Life}} \times \text{Yrs of Us}$$

## INCAPACITATING AGENTS PROGRAM RECONSTRUCTION

Application of Overhead for Fiscal Years 1950 through 1956.

Prior to 1957 the cost of overhead was separately funded by an account known as P5700 (Program Management Support) which supported all overhead on R&D programs. In 1957 Edgewood Arsenal was chartered under the Army Industrial Fund, from which time overhead was applied directly to in-house programs. Comptroller records prior to 1968 were disposed of in accord with regulations. Data available for fiscal years 1968 through 1975 show the rate of overhead in relation to total direct cost to be relatively constant, with an average annual overhead rate of 47.8 percent applicable to the Chemical and Biological Laboratories. To show in-house costs on a comparable footing for the period 1950 through 1975, overhead at the rate of 48 percent has accordingly been added to in-house costs for the period 1950-1956. The total overhead added, amounted to $307,824.

# SECTION II

## ANNUAL COSTS - 1950-1975

TOTAL INCAP PROGRAM

1950 THRU 1975

## INCAP PROGRAM

(In Thousands)

FY 1950

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4-08-03-001 | New Compounds | MUCOM | 20 | | | | |
| | INCAP | | 10 | - | 10 | 10 | |

### INCAP PROGRAM
### (In Thousands)
### FY 1961

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4-08-03-001 | New Compounds | MUCOM | 30 | | | | |
| | INCAP | | 10 | | 10 | 10 | |

INCAP PROGRAM

(In Thousands)

FY 1962

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 46411-001 | Psycologic Factors, AW, BW, CW<br>INCAP | MUCOM | 97<br>44.1 | 44.1 | - | | |
| 4X99 26-001 | Basic Research in Life Sciences<br>INCAP | MUCOM | 1760<br>116 | 100 | 16 | 16 | |
| TOTAL | Program<br>INCAP | | 1847<br>169.1 | 144.1 | 16 | 16 | |

# INCAP PROGRAM

(In Thousands)

FY 1953

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4-08-03-001 | New Compounds | MUCOM | 303 | | | | |
| | INCAP | | 15 | 0 | 15 | 15 | |
| 46411-001 | Psychologic Factors - AW, BW, CW | MUCOM | 17 | | | | |
| | INCAP | | 17 | - | 17 | - | 17 |
| 40802-010 | Neurological Action, CW | MUCOM | 103 | | | | |
| | INCAP | | 53 | - | 53 | - | 53 |
| 40802-013 | Pathological Action, CW | MUCOM | 89 | | | | |
| | INCAP | | 10 | - | 10 | - | 10 |
| TOTAL | Program | | 512 | | | | |
| | INCAP | | 95 | 0 | 95 | 15 | 80 |

# INCAP PROGRAM

(In Thousands)

FY 1954

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4-08-03-001 | New Compounds | MUCOM | 240 | | | | |
| | INCAP | | 16 | 0 | 16 | 16 | |
| 40802-010 | Neurological Action, CW | MUCOM | 187 | | | | |
| | INCAP | | 187 | 50 | 137 | | 137 |
| 45912-007 | Clinical Investigation CW | MUCOM | 339 | | | | |
| | INCAP | | 61.1 | 51.1 | - | | |
| 40802-013 | Pathological Action CW | MUCOM | 179 | | | | |
| | INCAP | | 24 | - | 24 | | 24 |
| TOTAL | Program | | 945 | | | | |
| | INCAP | | 277.1 | 101.1 | 176 | 16 | 161 |

## INCAP PROGRAM

(In Thousands)

FY 1956

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4 08 03-001 | New Compounds | MUCOM | 760 | | | | |
| | INCAP | | 20 | 0 | 20 | 20 | |
| 40802-018-01 | Neurological Action of CW Agents | MUCOM | 545 | | | | |
| | INCAP | | 145 | 72.2 | 72.8 | | 72.8 |
| TOTAL | Program | | 1305 | | | | |
| | INCAP | | 165 | 72.2 | 92.8 | 20 | 72.8 |

# INCAP PROGRAM

(In Thousands)

FY 1956

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 408 03-016 | Chemical Agents Res | MUCOM | 806 | | | | |
| | INCAP | | 161 | - | 161 | 161 | |
| 40802-018 | Medical Aspects of CW | MUCOM | 544 | | | | |
| | INCAP | | 132 | 53.5 | 78.5 | | 78.5 |
| 40802-016 | Toxicological Aspects of CW | MUCOM | 576 | | | | |
| | INCAP | | 15.8 | 15.8 | 0 | | 0 |
| 40802-019 | Physiological Bsis of CW | MUCOM | 336 | | | | |
| | | | 3 | - | 3 | | 3 |
| TOTAL | Program | | 2259 | | | | |
| | INCAP | | 311.8 | 69.3 | 242.5 | 161 | 81.5 |

## INCAP PROGRAM
(In Thousands)
FY 1967

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 40803-016 | Cml Agent Res | MUCOM | 1151 | | | | |
| | INCAP | | 290 | - | 290 | 290 | |
| 40802-018 | Medical Aspects of CW | MUCOM | 325 | | | | |
| | INCAP | | 86 | - | 85 | - | 85 |
| 40802-016 | Toxicological Aspects of CW | MUCOM | 530 | | | | |
| | INCAP | | 10 | - | 10 | - | 10 |
| 40802-019 | Physiological Basis of CW | MUCOM | 606 | | | | |
| | INCAP | | 100 | 97 | 3 | - | 3 |
| TOTAL | Program | | 2612 | | | | |
| | INCAP | | 485 | 97 | 388 | 290 | 98 |

## INCAP PROGRAM

## (In Thousands)

## FY 1968

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 40802-022-01 | Experimental Medicine & Clincal Invest. | MUCOM | 560 | | | | |
| | INCAP | | 334 | 145 | 189 | | 189 |
| 40802-023-02 | Pharmacology | MUCOM | 307 | | | | |
| | INCAP | | 126 | 19.9 | 106.1 | | 106.1 |
| 408-03-016 | Toxic CW Agents | MUCOM | 1372 | | | | |
| | INCAP | | 410 | 18 | 392 | 392 | |
| TOTAL | Program | | 2239 | | | | |
| | INCAP | | 870 | 182.9 | 687.1 | 392 | 295.1 |

## INCAP PROGRAM

(In Thousands)

FY 1959

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 40802-022 | Medical Aspects of CW | MUCOM | 542 | | | | |
| | INCAP | | 259 | 40 | 219 | - | 219 |
| 40802-023 | CW Biological Sciences Research | MUCOM | 1166.8 | | | | |
| | INCAP | | 42.2 | - | 42.2 | - | 42.2 |
| 40803-016 | Toxic CW Agents | MUCOM | 1600 | | | | |
| | INCAP | | 525 | 53.4 | 471.6 | 471.6 | - |
| TOTAL | Program | | 3308.8 | | | | |
| | INCAP | | 826.2 | 93.4 | 732.8 | 471.6 | 261.2 |

## INCAP PROGRAM

(In Thousands)

FY 1960

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4C08-02-022 | Medical Aspects of CS | MUCOM | 1255 | | | | |
| | INCAP | | 1071 | 263.8 | 807.2 | | 807.2 |
| 4C08-02-023 | CW Biological Sciences Res | MUCOM | 1713 | | | | |
| | INCAP | | 523 | 179.8 | 343.2 | | 343.2 |
| 4C08-03-016 | Toxicological Aspects of CS | MUCOM | 2710 | | | | |
| | INCAP | | 1220 | 179.6 | 1040.4 | 1040.4 | |
| TOTAL | | Program<br>INCAP | 5678<br>2814 | 623.2 | 2190.8 | 1040.4 | 1150.4 |

## INCAP PROGRAM
(In Thousands)
FY 1961

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CHL | BIOMED |
|---|---|---|---|---|---|---|---|
| 4C08-02-022 | Medical Aspects of CW | MUCOM | 1636 | | | | |
| | INCAP | | 1459 | 311.9 | 1147.1 | | 1147.1 |
| 4C08-02-023 | CW Biological Sciences Research | MUCOM | 2694 | | | | |
| | INCAP | | 1147 | 246 | 901 | | 901 |
| 4C08-02-016 | Toxicological Aspects of CW | MUCOM | 66 | | | | |
| | INCAP | | 65 | 66 | | | |
| 4C08-01-016 | Chemical Agent Research | MUCOM | 1498 | | | | |
| | INCAP | | 900 | 426.8 | 473.2 | 473.2 | |
| TOTALS | | Program<br>INCAP | 6793<br>3571 | 1049.7 | 2521.3 | 473.2 | 2048.1 |

INCAP PROGRAM

(In Thousands)

FY 1968

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4C08-03-016 | Toxic CW Agents | MUCOM | 4160 | | | | |
| | INCAP | | 2600 | 682.4 | 1917.6 | 1917.6 | |
| 4X99-26-001 | Basic Research in Life Science | MUCOM | 587 | | | | |
| | INCAP | | 543.8 | 241 | 302.8 | 0 | 302.8 |
| 4C08-02-024 | Medical & Biological Aspects of Cml Agts | MUCOM | 3382 | | | | |
| | INCAP | | 2266 | 641.3 | 1624.7 | | 1624.7 |
| TOTAL | | Program<br>INCAP | 8129<br>5409.8 | 1564.7 | 3845.1 | 1917.6 | 1927.5 |

## INCAP PROGRAM

(In Thousands)

FY 1963

| BA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 4C08-02-024 | Medical and Biological Aspects of Chemical Agts | MUCOM | 8196 | | | | |
| | INCAP | | 4995 | 1722.5 | 3272.5 | | 3272.5 |
| 4X99-26-001 | Basic Research in Life Sciences | MUCOM | 1681 | | | | |
| | INCAP | | 303.7 | 303.7 | | | |
| 4C0803-016 | Toxic CW Agents | MUCOM | 6481 | | | | |
| | INCAP | | 3500 | 1709.3 | 1790.7 | 1790.7 | |
| TOTAL | | Program<br>INCAP | 16358<br>8798.7 | 3735.5 | 5063.2 | 1790.7 | 3272.5 |

INCAP PROGRAM

(In Thousands)

FY 1964

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1A014501B71A | Life Science BR in Support of Materiel | MUCOM | 1328 | | | | |
| | INCAP | | 219 | 10 | 209 | | 209 |
| 1C622301A060 | Chemical Agents | MUCOM | 6426 | | | | |
| | INCAP | | 4400 | 3327 ✓ | 1073 | 1073 | |
| 1C522301A079 (Tasks 06 & 08) | Non-Def Med Aspects of Chemical Agents | MUCOM | 6304 | | | | |
| | INCAP | | 5138 | 2324 | 2814 | | 2814 |
| 1C622401A097 | Med Def Aspects of Chemical Agents | MUCOM | 2595 | | | | |
| | INCAP | | 766.1 | 157.1 | 609.0 | | 609.0 |
| 1A014501A91A | In-House Lab Indep R&D | MUCOM | 830 | | | | |
| | INCAP | | 63 | | 63 | | 63 |
| TOTAL | | Program<br>INCAP | 17483<br>10586.1 | 5818.1 | 4768 | 1073 | 3695 |

INCAP PROGRAM
(In Thousands)
FY 1966

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1C522301A060 | Chemical Agents | MUCOM | 5910 | | | | |
| | INCAP | | 3800 | 2796.3 | 1003.7 | 1003.7 | |
| 1C014501B71A-02 | Life Science, Basic Res in Spt of Matls | MUCOM | 1312 | | | | |
| | INCAP | | 387.1 | 266.6 | 120.5 | 0 | 120.5 |
| 1C522301A079 | Non-Def Medical Aspects of Chemical Agts | MUCOM | 5853 | | | | |
| | INCAP | | 4252 | 1147 | 3106 | | 3106 |
| 1C622401A097 | Medical Defense Aspects of Chemical Agts | MUCOM | 2610 | | | | |
| | INCAP | | 1815 | 161.2 | 1653.8 | | 1663.8 |
| 1L013001A91A | In-House Lab Indep Rsch | MUCOM | 1150 | | | | |
| | INCAP | | 40 | | 40 | | 40 |
| TOTALS | | Program<br>INCAP | 16835<br>10294.1 | 4371.1 | 5923 | 1003.7 | 4919.3 |

INCAP PROGRAM

(In Thousands)

FY 1966

| DA PROJECT NO | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1C522301A060 | Chemical Agents | MUCOM | 6252 | | | | |
| | INCAP | | 4300 | 3528.4 | 771.6 | 771.6 | |
| 1C014501B71A | Life Science BR In Spt of Matl | MUCOM | 816 | | | | |
| | INCAP | | 154 | 58.4 | 95.6 | | 95.6 |
| 1C522301A079 (Tasks 06 & 08) | Non Def Med Aspects of Cml Agts | MUCOM | 3703 | | | | |
| | INCAP | | 2315 | 282.9 | 2032.1 | | 2032.1 |
| 1C622401A097 (Tasks 08 & 10) | Med Def Aspects of Cml Agts | MUCOM | 1169 | | | | |
| | INCAP | | 612 | 33 | 479 | | 479 |
| 1L013001A91A | In-House Lab Indep Rsch | MUCOM | 500 | | | | |
| | INCAP | | 86 | 0 | 86 | | 86 |
| TOTALS | | Program | 12439 | | | | |
| | | INCAP | 7367 | 3902.7 | 3464.3 | 771.6 | 2692.7 |

## INCAP PROGRAM

(In Thousands)

FY 1967

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1C014501B71A | Life Sciences BR In Support of Material | MUCOM | 959 | | | | |
| | INCAP | | 191 | 69.8 | 121.2 | | 121.2 |
| 1C522301A060 | Chemical Agents | MUCOM | 4444 | | | | |
| | INCAP | | 1650 | 762.3 | 887.7 | 887.7 | |
| 1C522301A079 (Tasks 06 & 08) | Non-Defense Med Aspects of Chemical Agents | MUCOM | 3367 | | | | |
| | INCAP | | 1669 | 180 | 1479 | | 1479 |
| 1C622401A097 (Tasks 08 & 10) | Med Defense Aspects of Chemical Agents | MUCOM | 1167 | | | | |
| | INCAP | | 505 | | 505 | | 505 |
| 1L013001A91A | In-House Lab Initiated R&D | MUCOM | 500 | | | | |
| | INCAP | | 70 | | 70 | | 70 |
| TOTAL | | Program<br>INCAP | 10437<br>4075 | 1012.1 | 3062.9 | 887.7 | 2175.2 |

INCAP PROGRAM

(In Thousands)

FY 1968

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1B014501B71A | Life Sciences BR In Support of Materiel | MUCOM | 660 | | | | |
| | INCAP | | 170 | 1.8 | 168.2 | | 168.2 |
| 1B522301A060 | Chemical Agents | MUCOM | 3570 | | | | |
| | INCAP | | 1350 | 608.8 | 741.2 | 741.2 | |
| 1B522301A079 | Non-Def Med Aspects of Cml Agents | MUCOM | 3007 | | | | |
| | INCAP | | 1490 | 133.4 | 1356.6 | | 1356.6 |
| 1B622401A097 | Med Defense Aspects of Cml Agents | MUCOM | 963 | | | | |
| | INCAP | | 387.7 | | 387.7 | | 387.7 |
| 1T013001A91A | In-House Lab Independent Rsch | MUCOM | 626 | | | | |
| | INCAP | | 100 | | 100 | | 100 |
| TOTAL | | Program<br>INCAP | 8625<br>3497.7 | 744 | 2753.7 | 741.2 | 2012.5 |

INCAP PROGRAM

(In Thousands)

FY 1969

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1B061102B71A | Life Sciences BR In Support of Materiel | MUCOM | 669 | | | | |
| | INCAP | | 300 | | 300 | | 300 |
| 1B662602A060 | Chemical Agents | MUCOM | 3293 | | | | |
| | INCAP | | 1000 | 237.7 | 762.3 | 762.3 | |
| 1B562602A079 | Non-Def Med Aspects of Cml Agents | MUCOM | 3232 | | | | |
| | INCAP | | 1664 | 44.7 | 1619.3 | | 1619.3 |
| 1B662706A097 | Med Defense Aspects of Cml Agents | MUCOM | 1036 | | | | |
| | INCAP | | 390 | | 390 | | 390 |
| 1T061101A91A | In-House Lab Initiated R&D | MUCOM | 626 | | | | |
| | INCAP | | 93 | | 93 | | 93 |
| TOTAL | | Program<br>INCAP | 8755<br>3447.0 | 282.4 | 3164.6 | 762.3 | 2402.3 |

INCAP PROGRAM

(In Thousands)

FY 1970

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1T161101A91A | In-House Lab Ind Research | MUCOM | 641.3 | | | | |
| | INCAP | | 40 | | 40 | | 40 |
| 1T161102B71A-02 | Life Science BR in Spt of Cml Mat'l | MUCOM | 939 | | | | |
| | INCAP | | 436 | | 436 | | 435 |
| 1W662620AD12-01 | Chemistry of Incap Agts | MUCOM | 762 | | | | |
| | INCAP | | 762 | | 762 | 762 | |
| 1W662620AD12-02 | Bio Med Eval of Incap Agts | MUCOM | 997 | | | | |
| | INCAP | | 997 | 48 | 949 | | 949 |
| 1W762718AD19-01 | Performance of Chem Exposed Pers | MUCOM | 217.7 | | | | |
| | INCAP | | 217.7 | | 217.7 | | 217.7 |

1970

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1W762718AD19-04 | New Methods for Bio Assy | MUCOM | 147.4 | | | | |
| | INCAP | | 36.8 | | 36.8 | | 36.8 |
| 1W762710AD25-03 | Prophylaxis & Therapy of Incap Agts | MUCOM | 522.7 | | | | |
| | INCAP | | 522.7 | | 522.7 | | 522.7 |
| 1W762718AD10 | Search for New Chemical Agents | MUCOM | 1062.3 | | | | |
| | INCAP | | 465 | | 465 | 465 | |
| 1W762718AD10-03 | Toxicology of New Cml Agts | MUCOM | 360.4 | | | | |
| | INCAP | | 85 | 85 | 0 | | 0 |
| TOTALS | | Program<br>INCAP | 5639.8<br>3561.2 | 133 | 3418.2 | 1217 | 2201.2 |

Continuation Page - FY. 70

# INCAP PROGRAM

(In Thousands)

FY 1971

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | In-HOUSE | CML | BIO |
|---|---|---|---|---|---|---|---|
| 1T161102B71A | Life Science BR in Spt of Cml Matl | MUCOM | 880 | | | | |
| | INCAP | | 366 | | 366 | | 366 |
| 1W162116AD19-01 | Pert Eval of Chem Exposed Pers | MUCOM | 320 | | | | |
| | INCAP | | 320 | | 320 | | 320 |
| 1W162116AD19-04 | New Methods for Bio Assay | MUCOM | 250 | | | | |
| | INCAP | | 62.5 | | 62.5 | | 62.5 |
| 1B062116AD21-02 | Physiological Eval of Cml Agts | MUCOM | 675 | | | | |
| | INCAP | | 510 | | 510 | | 510 |
| 1B062116AD21-03 | Clinical Eval of Cml Agts | MUCOM | 675 | | | | |
| | INCAP | | 600 | | 600 | | 600 |
| 1W662710AD25-03 | Prophylaxis & Therapy of Incap Agts | MUCOM | 550 | | | | |
| | INCAP | | 550 | | 550 | | 550 |
| 1W562607AD12-01 | Chemistry of Incap Agts | MUCOM | 360 | | | | |
| | INCAP | | 360 | | 360 | 360 | |

1971

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIO |
|---|---|---|---|---|---|---|---|
| 1W762718AD10 | Search for Potential Cml Agts | MUCOM | 1,000 | | | | |
| | INCAP | | 328 | | 326 | 328 | |
| TOTALS | | Program | 4,700 | | | | |
| | | INCAP | 2,983.8 | | 2,983.8 | 678 | 2,308.8 |

Continuation Page - FY ~~72~~ 71

INCAP PROGRAM
(In Thousands)
FY 1972

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1T161101A91A | In-House Independ Rsch | MUCOM | 625 | | | | |
| | INCAP | | 30 | | 30 | | 30 |
| 1T161102B71A-02 | Life Science BR in Spt of Cml Matl | MUCOM | 800 | | | | |
| | INCAP | | 169 | | 169 | | 169 |
| 1W162116AD19-01 | Perf Eval of Chem Exposed Pers | MUCOM | 370 | | | | |
| | INCAP | | 370 | | 370 | | 370 |
| 1W162116AD19-04 | New Methods for Bio Assay | MUCOM | 270 | | | | |
| | INCAP | | 67.5 | | 67.5 | | 67.5 |
| 1W762718AD21-01 | Toxicology of Cml Agts | MUCOM | 685 | | | | |
| | INCAP | | 30 | | 30 | | 30 |
| 1W762718AD21-02 | Physiology Eval of Cml Agts | MUCOM | 660 | | | | |
| | INCAP | | 460 | | 460 | | 460 |
| 1W762718AD21-03 | Clinical Eval of Chem Agts | MUCOM | 610 | | | | |
| | INCAP | | 460 | | 460 | | 460 |
| 1V662620A012-01 | Chem of Incap Agts | MUCOM | 400 | | | | |
| | INCAP | | 400 | | 400 | 400 | |
| 1W762718AD10 | Search for Potential Cml Agents | MUCOM | 900 | | | | |
| | INCAP | | 285 | | 285 | 285 | |

1972

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1W762718AD25-03 | Prophylaxis & Therapy of Incap Agts | MUCOM | 465 | | | | |
| | INCAP | | 465 | | 465 | | 465 |
| TOTALS | | Program | 5476 | | | | |
| | | INCAP | 2716.5 | | 2716.5 | 685 | 2031.5 |

Continuation Page - FY 72

INCAP PROGRAM

(In Thousands)

FY 1973

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIO |
|---|---|---|---|---|---|---|---|
| 1T161101A91A | In-House Lab Ind Research | MUCOM | 650 | | | | |
| | INCAP | | 106 | | 106 | | 106 |
| 1T161102B71A-02 | Support of Chem Matl EA | MUCOM | 700 | | | | |
| | INCAP | | 168 | | 168 | | 168 |
| 1W062116AD19-01 | Perf Eval of Chem Exp Pers | MUCOM | 195 | | | | |
| | INCAP | | 195 | | 195 | | 195 |
| 1W062116AD19-04 | New Method for Bio Assay | MUCOM | 295 | | | | |
| | INCAP | | 73.7 | | 73.7 | | 73.7 |
| 1W762718AD21-02 | Physiological Eval of Cml Agts | MUCOM | 500 | | | | |
| | INCAP | | 375 | | 375 | | 375 |
| 1W762718AD21-03 | Clinical Eval of Chem Agts. | MUCOM | 425 | | | | |
| | INCAP | | 300 | | 300 | | 300 |
| 1W762710AD25-03 | Prophylaxis & Therapy for Incap Agts | MUCOM | 300 | | | | |
| | INCAP | | 300 | | 300 | | 300 |

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIO |
|---|---|---|---|---|---|---|---|
| 1W662620AD12-01 | Chemistry of Incap Agts | MUCOM | 270 | | | | |
| | INCAP | | 270 | | 270 | 270 | |
| 1W762718AD10 | Search for Potential Cml Agents | MUCOM | 600 | | | | |
| | INCAP | | 185 | | 185 | 185 | |
| TOTALS | | Program<br>INCAP | 3635<br>1972.7 | | 1972.7 | 455 | 1517.7 |

Continuation Page - FY ~~74~~ 73

INCAP PROGRAM

(In Thousands)

FY 1974

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED | DOE |
|---|---|---|---|---|---|---|---|---|
| 1T161101A91A | In-House Lab Ind Res<br>INCAP | ARMCOM | 526<br>126 | | 126 | | 126 | |
| 1T161102B71A02 | Support of Cml Mat'l<br>INCAP | ARMCOM | 690<br>107 | | 107 | | 107 | |
| 1W762718AD19-01 | Perf Eval of Cml Exposed Pers<br>INCAP | ARMCOM | 165<br>165 | | 165 | | 165 | |
| 1W762718AD21-02 | Physiological Eval of Cml Agents<br>INCAP | ARMCOM | 370<br>300 | | 300 | | 300 | |
| 1W762718AD21-03 | Clinical Eval of Cml Agents<br>INCAP | ARMCOM | 400<br>250 | | 250 | | 250 | |
| 1W662620A121201 | Chemistry of INCAP Agents<br>INCAP | ARMCOM | 345<br>345 | | 345 | 345 | | |
| 1W762710AD25-03 | Prophylaxis & Therapy for INCAP Agents<br>INCAP | ARMCOM | 300<br>300 | | 300 | | 300 | |
| 1W762718A010 | Search for Potential Cml Agts<br>INCAP | ARMCOM | 5095<br>160 | | 160 | 160 | | |

## INCAP PROGRAM
(In Thousands)

FY 1974 (continued)

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1W162116AD19-04 | New Methods for Bio Assay | ARMCOM | 305 | | | | |
| | INCAP | | 76.2 | | 76.2 | | 76.2 |
| TOTAL | Program | | 3609.5 | | | | |
| | INCAP | | 1829.2 | | 1829.2 | 505 | 1324.2 |

# INCAP PROGRAM

(In Thousands)

FY 1975

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED |
|---|---|---|---|---|---|---|---|
| 1T161101A91A | In-House Lab Ind Res | ARMCOM | 819 | | | | |
| | INCAP | | 60 | | 60 | | 60 |
| 1T161102B71A-02 | Support of Cml Mat EA | ARMCOM | 850 | | | | |
| | INCAP | | 110 | | 110 | | 110 |
| 1W762718AD19-01 | Performance Eval of Chem Exp Pers | ARMCOM | 100 | | | | |
| | INCAP | | 100 | | 100 | | 100 |
| 1W762718AD21-02 | Physiological Eval of Cml Agts | ARMCOM | 430 | | | | |
| | INCAP | | 300 | | 300 | | 300 |
| 1W762718AD21-03 | Clinical Eval of Cml Agents | | 375 | | | | |
| | INCAP | | 275 | | 275 | | 275 |
| 1W662620AD12-01 | Chemistry of Incap Agts | ARMCOM | 210 | | | | |
| | INCAP | | 210 | | 210 | 210 | |
| 1W762710AD25-03 | Prophylaxis & Therapy for Incap Agts | ARMCOM | 200 | | | | |
| | INCAP | | 200 | | 200 | | 200 |

| DA PROJECT NO. | TITLE | SOURCE | RELEASED PROGRAM | CONTRACT | IN-HOUSE | CML | BIOMED | |
|---|---|---|---|---|---|---|---|---|
| 1W762718A010 | Eval of New Chem for Potent Mission Appl | ARMCOM | 600 | | | | | |
| | INCAP | | 128 | | 128 | 128 | | |
| TOTAL | | Program<br>INCAP | 3184<br>1380 | | 1380 | 338 | 1048 | |

# SECTION III

## CONTRACT COSTS - 1950-1975

# SCHEDULE OF CONTRACTUAL ACTIONS

1950 THRU 1975

FY 1952

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4B08-03-016 (CHL) | 4564 | TOTAL PROJ<br>7% | $1,386,555<br>100,000 | Shell Dev Co | Investigate & Develop Potential CW Agents & Synthesis of Special Compounds |

FY 1952

## OUT-OF-HOUSE CONTRACTS (NON-ATY)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4611-001 (B10) | 2913 | | $19,808 | N Y Psychiatric | Conduct Studies, Experimental Investigations and Tests to Determin Psychological Effects of Certain Psychochemical Agts on Human Subjects |
| | 2914 | | 12,444 | N Y Psychiatric | Experimental Invest & Tests to Determine Clinical Effects of Psychochemical Agents on Psychiatric Behavior of Human Subjects |
| | 4915 | | 11,832 | N Y Psychiatric | Studies on Clinical & Psychological Effects of Psychochemical Agts on Human Subjects |
| | | TOTAL PROJ | $44,084 | | |

— 215

FY 1954

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 40802-010 (B10) | 5150 | TOTAL PROJ | $ 50,000 | Rsch Found for Mental Hyg | Conduct Psychiatric, Psychological & Therapeutic Studies of Compounds |
| 45912-007 (B10) | 5519 | TOTAL PROJ | $ 51,077 | Univ of Maryland | Perform Clinical and Laboratory Studies on Effects - Atropine Substitutes |

FY 1955

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 40402-018-01 (DIO) | 5198 | | $48,000 | Rsch Found for Mental Hyg | Conduct Psychiatric, Psychological & Therapeutic Studies of Compounds |
| | 5596 | | 15,205 | Tulane University | Conduct Clinical Studies During Administration of Mescaline, Chloropromazine & Such Other Diagnostic & Therapeutic Drugs (Study Neurological & Psychiatric Change Produced) |
| | 5663 | | 9,000 | University of Michigan | Conduct Research on Pharmacology of Certain Compounds Affecting the Central Nervous Systems of Animals & Man |
| | | TOTAL PROJ | $72,205 | | |

FY 1956

## OUT-OF-HOUSE CONTRACTS (NON-AIT)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 40802-018-04 (B10) | 5519 | | $ 12,101 | U of Maryland | Perform Clinical and Laboratory Studies on Effect - Atropine Substitutes |
| 40802-018-01 | 5663 | | 41,400 | Univ of Michigan | Conduct Research on Pharmacology of Certain Compounds Affecting the Central Nervous Systems of Animals & Man |
| | | TOTAL PROJ | $ 53,501 | | |
| 40802-016-02 | 5596 | TOTAL PROJ | $ 15,829 | Tulane University | Conduct Clinical Studies During Administration of Mescaline, Chloropromazine & Such Other Diagnostic & Therapeutic Drugs (Study Neurological & Psychiatric Change Produced) |

FY 1957

OUT-OF-HOUSE CONTRACTS (NON-ATF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 40802-019-02 (MIO) | 5198 | | $ 44,739 | Rsch Found for Mental Hyg | Conduct Psychiatric, Psychological & Therapeutic Studies of Compounds |
| | 5596 | | 12,611 | Tulane University | Conduct Clinical Studies During Administration of Mescaline Chloropromazine & Such Other Diagnostic & Therapeutic Drugs (Study Neurological & Psychiatric Change Produced) |
| | 6364 | | 40,000 | Univ of Washington | Neurological Action of CW Agents |
| | | TOTAL PROJ | $ 97,350 | | |

FY 1958

OUT OF HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 48082-02201 (B10) | 5596 | | $ 10,151 | Tulane University | Conduct Clinical Studies During Administration of Mescaline, Chloropromazine & Such Other Diagnostic & Therapeutic Drugs (Study Neurological & Psychiatric Change Produced) |
| | 49 | | 25,000 | Rsch Found for Mental Hosp | Research Studies in Measurement of Psychiatric, Psychological and Special Therapeutic Effects of Certain Compounds |
| | 6337 | | 89,897 | Univ of Maryland | Psychiatric & Psychological Studies to Determine Effects in Normal Volunteers & Mental Patients (2 or More Atropine Substitutes) |
| | 6364 | | 20,000 | Univ of Washington | Neurological Action of CW Agents |
| | | TOTAL PROJ | $145,048 | | |
| 48082-023-02 | 5663 | TOTAL PROJ | $ 19,897 | Univ of Michigan | Conduct Research of Pharmacology of Certain Compounds Affecting the Central Nervous Systems of Animals & Man |

FY 1958

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4008-03-016 (CWL) |  | 100 TOTAL PROJ | $18,000 | Univ of Calif | Investigation of Ryanodine |

FY 1959

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4008-03-016 (CML) | (896) 6572 | F 50% | $70,736<br>35,368 | FMC Corp | Synthesis of Compounds for Use in CML Rsch |
| | 188 | | 18,000 | U of Calif | Investigation of Ryanodine |
| | | TOTAL PROJ<br>FACTORED | $88,736<br>53,368 | | |

FY 1959

## OUT-OF-HOUSE CONTRACTS (NON-ATF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 40802-022-03 (BIO) | 6364 | TOTAL PROJ | $ 40,000 | Univ of Washington | Neurological Action of CW Agents |

FY 1960

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4008-03-016 (CML) | (323) 6371 | | $ 23,700 | Univ of Del | Synthesis Organic Compounds not Commer. Avail. |
| | | F 40% | 9,480 | | |
| | 6632 | | 47,610 | Monsanto Cml | Stdy of Intermediates of Selected Agents |
| | | F 1/3 | 15,870 | | |
| | ~~6638~~ | | 20,700 | Univ of Conn | Biological Routes to the Synthesis of EA 1729 |
| | 807 | | 50,000 | Monsanto Cml | Stdy of Intermediates of Selected Agents |
| | | F 1/3 | 16,600 | | |
| | 839 | | 45,000 | Stanford Rsch Inst | Syn of Nitrogen containing Heterocyclic Compounds Possessing Physiological Activity |
| | 6374 | | 49,291 | Woodard Res Corp | Screening of Selected Compounds |
| | | F 1/3 | 16,430 | | |
| | (296) 6372 | | 75,126 | FMC Corp | Synthesis of Compound for Use In Cml Resh |
| | | F 1/2 | 37,560 | | |
| | 188 | | 18,000 | Univ of Calif | Invest of Ryanodine ($28 Dum) 6/58 - 8/61 |
| | | TOTAL PROJ | 329,430 | | |
| | | FACTORED | 179,640 | | |

FY 1960

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 40802-022 (BIO) | 6364 | | $ 121,530 | Univ of Washington | Neurological Action of CW Agents |
| | 6613 | | 30,000 | Univ of Calif | Collection & Study of Plants Containing Disabling Substances |
| | 6609 | | 18,000 | Johns Hopkins | Effects of Drugs and CW Agents on the EEG |
| | | F 25% | 4,500 | | |
| | 6568 | | 119,700 | Hazelton Labs | Biological Evaluation of Lethal & Incapacitating Agents |
| | | F 90% | 107,730 | | |
| | | TOTAL PROJ | $ 289,230 | | |
| | | FACTORED | 263,760 | | |
| 40602-023 (BIO) | 6629 | | $ 48,670 | Vanderbilt Univ | Study & Evaluation of New Compounds |
| | 6616 | | 18,994 | Univ of Miss | Pharm Stdy on Central Synaptic Sys Affecting Motor Function |
| | 755 | | 4,800 | Univ of Calif | Coll. of Biologically-Active Substances from the Natural Source |
| | 6591 | | 30,000 | Ind U Found Rsch | Psychological Studies of the Effects of Incapacitating Agents |
| | (735) 7003 | | 20,000 | Regents of Calif | Pharm Investigations of Centrally Active Compounds |
| | 264 | | 36,507 | Univ of Colo | Investigation and Treatment of CW Casualties |
| | 6599 | | 20,834 | S B Penick | Isolation & Association Studies W/Toxic Extractives of Genus Ryania |
| | | TOTAL PROJ | $179,805 | | |

FY 1961

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE | |
|---|---|---|---|---|---|---|
| 4008-03-016 (Cont.) | 162 | | 1,600 | Univ of Conn | Inv of Withania Somnifera Alkaloid | |
| | 654 | | 8,000 (Cum) | Univ of Del | Synthetic Methods for Heterocylic Ring Systems | 1/60 - 6/61 |
| | 734 | | 20,000 | Univ of Conn | Biological Synthesis of EA 1729 5-604-80 | 4/60 - 7/62 |
| | 269 | | 11,000 | Univ of Iowa | Inv of Indole Alkaloids XO 5-604-83 | 11/58 - 10/61 |
| | 815 | | 22,500 (Cum) | Southern Rsch Inst | Screening Anti-Cancer Cpds for Incapacity | 10/60 - 9/61 |
| | 906 | | 21,000 (Cum) | Rutgers Univ | Syn of Cpds for Use as Incapacity Agts | 9/60 - 8/61 |
| | 930 | | 22,000 (Cum) | Georgetown Univ | Syn & Eval of Drugs as Incapacity Agts | 9/60 - 9/61 |
| | 947 | | 57,600 (Cum) | Olin-Mathieson | Syn of Glycolic Acid Esters | 10/60 - 10/61 |
| | 6625 | | 39,300 (Cum) | Regis Chem Co | Syn of Non-Commercial Avail Cpds | 6/61 - 6/62 |
| | 6631 | | 55,000 | Armour Rsch Found | Biochemical St of EA 2277 ($654 Cum) | 7/61 - 6/62 |
| | | F 1/3 | 18,300 | | | |
| | 807 | | 47,600 | Monsanto Chem Co | St of Intermediates of Selected ($97.6 Cum) | 5/60 - 5/62 |
| | | F 1/3 | 15,860 | | | |
| | (188) 6567 | | 10,000 | Univ of Cal | Invest of Ryanodine ($28 Cum) | 6/58 - 8/61 |
| | 6574 | | 74,900 | Woodard Res Corp | Screening of Selected Compounds | |
| | | F 1/3 | 24,960 | | | |
| | 734 | | 40,700 | Univ of Conn | Biological Routes to the Synthesis of EA 1729 | |
| | 525 | | 35,700 | Univ of Del | Synthesize Organic Compounds Not Commer. Avail. | |
| | | F 40% | 14,280 | | | |
| | (296) 6572 | | 79,619 | FMC Corp | Synthesis of Compounds for Use in Chem Rsch | |
| | | F 1/2 | 39,800 | | | |
| | 028 | | 16,413 | U of New Hampshire | Chem Synthesis of Analogs of Actinomycin | |

LEGEND: G - GRANTS

FY 1961

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE | |
|---|---|---|---|---|---|---|
| 4008-03-016 (Cont.) Toxic CW Agents | 0-1 | | $ 12,500 | Univ of Conn | Characterization of Withania Somnifera Alkaloid | 9/60 - 8/61 |
| | 0-5 | | 11,000 | Univ of Oregon | Inv Alkaloids of Calabash Curare | 9/60 - 9/61 |
| | 0-28 | | 20,000 | Univ of New Hampshire | Chem Syn of Analogs of Actinomycin | 6/61 - 6/63 |
| | | PROJ TOTAL | $666,452 | | | |
| | | FACTORED | 426,813 | | | |

LEGEND: O - GRANTS

FY 1961

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4008-02-022/023 (BIO) | 6611 | | $ 30,000 | U of Calif | Collection & Study of Plants Containing Disabling Substance |
| | 6652 | | 30,000 | Contrib of Penna Hosp | Neurological Eval of New Agents |
| | 6601 | | 50,000 | St Louis University | Neurotropic Effects in Relation to Chemical Structure |
| | 6609 | | 20,000 | Johns Hopkins | Effects of Drugs and CW Agents on the [illegible] |
| | | F 25% | 5,000 | | |
| | 6568 | | 200,451 | Hazelton Labs | Biological Evaluation of Lethal & Incapacitating Agents |
| | | F 90% | 180,400 | | |
| | 6591 | | 16,360 | Indiana U Found Rsch | Psychological Studies of the Effects of Incapacitating Agents |
| | 6663 | | 45,000 | U of Maryland | Incapacitating Actions of CW Chemicals |
| | 6614 | | 51,840 | No Am Avia Corp | Aircrew Perform Decrement Resulting from Ingestion of Incapacitating Agents |
| | 030 | | 10,000 | Maimonides Hospital | 9/61 - 8/62 Effects of Drugs on Central Neural & Neuromuscular Systems |
| | 010 | | 30,005 | Univ of Illinois | 10/60 - 10/61 Psychotomimetic & Psychotronic Agents - Brain Enzyme Systems |
| | 017 | | 24,000 | Univ of Wisconsin | 10/60 - 9/61 Pharmacologic Materials that Disrupt the Central Nervous System Primates |
| | [illegible] | | 13,000 | U of Maryland | Mechanism of Action of Ryanodine on Mammalian Skeletal Muscle |
| | [illegible] | | 51,381 | Vanderbilt Univ | Study & Evaluation of New Compounds |
| | [illegible] | | 20,834 | S B Penick | Isolation & Association Studies W/Toxic Constituents of [illegible] Ryania |
| | | TOTAL PROJ | $552,[illegible] | | |
| | | FACTORED | 551,[illegible] | | |
| 4008-03-016 (BIO) | 6632 | | 65,000 | I I T Rsch Inst (Armour) | Effects of New Chemical on Physiological System of the Dog |

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FY 1962

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4000-03-016 (CML) | 6572 | | $ 84,546 | FMC Corp | Synthesis of Compounds for Use in Cml Rsch |
| | | F 1/2 | 42,270 | | |
| | 529 | | 39,000 | Univ of Del | Synthesis Organic Compounds Not Commer. Avail. |
| | | F 40% | 15,600 | | |
| | 6574 | | 79,073 | Woodard Rsch | Screening of Selected Compounds |
| | | F 1/3 | 26,350 | | |
| | 6632 | | 97,610 | Monsanto Cml | Stdy of Intermediates of Selected Agents |
| | | F 1/3 | 32,536 | | |
| | 6673 | | 400,000 | E I Dupont | Evaluation & Synthesis of Cml Compounds |
| | 7024 | | 9,200 | Stanford Res Inst | Survey of Recent Foreign Scientific Dev |
| | | F 1/2 | 4,600 | | |
| | 7121 | | 61,000 | Lakeside Lab | Synthesis of Substituted Glycolic Esters |
| | | TOTAL PROJ | $770,429 | | |
| | | FACTORED | 582,356 | | |
| 4X99-26-001 (CML) | 035 | | 15,000 | Univ of Conn | Isolation & Characterization of Withania Somnifera |
| | 6673 | | 50,000 | E I Dupont | Eval & Synthesis of Cml Compounds |
| | 7077 | | 35,000 | Stanford Res Inst | Synthesis of Nitrogen - Containing Heterocyclic N Compounds |
| | 024 | | 9,065 | Univ of Del | Synthesis & Chem of Heterocyclic Compounds |
| | | TOTAL PROJ | $109,065 | | |

LEGEND: O - GRANTS

FY 1962

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4008-02-004 (BIO) | 6613 | | $ 48,406 | U of Calif | Collection & Study of Plants Containing Disabling Substance |
| | 6652 | | 52,220 | Contrib of Penna Hosp | Neurological Eval of New Agents |
| | 6601 | | 76,000 | St Louis Univ | Neurotropic Effects in Relation to CML Structure |
| | 6631 | | 90,600 | I I T Rsch Inst (Armour) | Effects of New CML on Physiological Sys of the Body |
| | 6616 | | 37,904 | Univ of Miss | Pharm Studies on Central Synaptic Sys Affecting Motor Funct |
| | 6609 | | 20,000 | Johns Hopkins | Effects of Drugs & CML Agts on the EEG |
| | | F 25% | 5,000 | | |
| | 6568 | | 245,287 | Hazelton Labs | Biological Eval of Lethal & Incapacity Agts |
| | | F 90% | 220,758 | | |
| | 6591 | | 3,800 | Indiana U Found Rsch | Psychological Studies of the Effects of Incapacity Agts |
| | 7069 | | 10,287 | Jefferson Med Col | Neuropharmacological Profile of Psychotomimetic Activity |
| | 7113 | | 30,000 | U of Tenn | Local Treatment of Vesicant Burns |
| | 7043 | | 10,743 | Regents of U of Calif | Conduct Pharmacological Invest of Centrally Active Cmpds of CML Corps Interest |
| | 6562 | | 39,000 | U of Maryland | Incapacitating Actions of CHS |
| | 036 | | 6,552 | Baylor University | Oct 61 - 30 Sep 62-Quan Comparison of Central & Peripheral Actions of Some Anesthetic Cmpds |
| | 039 | | 10,000 | Maimonides Hospital | Sep 61 - 31 Aug 62- Pharmacological Influences on the Neuro and Spinal Synaptic Junctions |
| | | TOTAL PROJ | $680,799 | | |
| | | FACTORED | 641,270 | | |

FY 1962

## OUT-OF-HOUSE CONTRACTS (NON-AIT)

| PROJECT/ TASK | CONTR NO | PERCENT APTL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4X99-26-001 (B10) | 034 | | $ 38,750 | Univ of Wisconsin | Oct 61 - Sep 62 - Behavioral Effects of Pharm, Matl that Disrupt the Central Nervous System - Primates |
| | 037 | | 13,000 | Univ of Maryland | Nov 61 - Oct 62 - Mechanism of Action of Ryanodine on Mammalian Skeletal Muscle |
| | 041 | | 40,085 | Univ of Ill | Oct 61 - Oct 62 - Action of Various Psychotomimetic Agents on Brain Enzyme Systems |
| | 042 | | 22,900 | Rutgers Univ | Nov 61 - Oct 62 - Synthesis of CHL Cmpds W/Potent Physiological Effects |
| | 046 | | 14,990 | Univ of Penna | Dec 61 - Dec 62 - Experimental Basis for Treating Chemical Casualties |
| | | F 10% | 1,490 | | |
| | 052 | | 14,920 | Univ of Penna | Jun 62 - May 63 - Study on the cellular actions of Neuro-humoral Transmitters |
| | | TOTAL PROJ | $144,645 | | |
| | | FACTORED | 131,145 | | |

FY 1963

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4C08-03-016 (Cont.) | (525) 6571 | | $31,900 | Univ of Del | Synthesize Organic Compounds not Commer. Avail. |
| | | F 40% | 12,760 | | |
| | (591) 6574 | | 97,771 | Woodard Res Corp | Screening of Selected Compounds |
| | | F 1/3 | 32,590 | | |
| | (296) 6572 | | 88,952 | FMC Corp | Synthesis of Compounds for Use in Cml Rsch |
| | | F 1/2 | 44,470 | | |
| | 6625 | | 45,000 | Regis Cml Co | Synthesis of Non-Commercial Compounds |
| | 6673 | | 532,000 | E I Dupont | Evaluation & Synthesis of Cml Compounds |
| | 77 | | 9,000 | Stanford Res | Industrial Liaison with Foreign Concerns |
| | | F 1/2 | 4,500 | | |
| | 103 | | 430,000 | A D Little | Incapacitating Agent Rsch |
| | 108 | | 600,000 | FMC Corp | Incapacitating Agent Rsch |
| | | TOTAL PROJ | $1,812,623 | | |
| | | FACTORED | 1,709,320 | | |
| 4X99-25-001 (01) | 024 | | 11,000 | U of Del | Heterocyclic Nitrogen Compounds |
| | 028 | | 12,000 | U of New Hampshire | Cml Synthesis of Analogs of Actinomycin |
| | 6673 | | 150,000 | E I Dupont | Evaluation & Synthesis of Cml Compounds |
| | 42 | | 50,000 | U of Conn | Invest of Alkaloid Products in Saprophytic Culture |
| | 7077 | | 35,000 | Stanford Inst | Heterocyclic Nitrogen Compounds |
| | | TOTAL PROJ | $258,000 | | |

FY 1963

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4008-02-024 (810) | 6652 | | $ 50,000 | Contrib of Penna Hosp | Neurological Eval of New Agts |
| | 6601 | | 142,000 | St. Louis Univ | Neurotropic Effects in Relation to Chem Structure |
| | 6631 | | 40,000 | I I T Rsch Inst (Armour) | Biomed Studies of HD |
| | 26 | | 47,626 | Inst for Behavioral Rsch | Drug Eff & Complex Behavioral Repertoires Under Conditions of Full Environ Control |
| | 6616 | | 18,906 | Univ of Miss | Pharm Study of Central Synaptic Sys Effecting Motor Functi |
| | 6568 | | 37,440 | Hazelton Labs | Biological Eval of Lethal & Incapacitating Agts |
| | | Y 90% | 33,690 | | |
| | 138 | | 18,752 | U of Cinn | Study of Hypothalmic Neurosecretary Mechanisms |
| | 6590 | | 8,000 | Indianna U Found Rsch | Basic Psychological Studies of the Effects of Incapacitati Agts |
| | 7113 | | 29,565 | U of Tenn | Local Treatment of Vesicant Burns |
| | 7217 | | 53,265 | Stanford Rsch Inst | Study of Comparative Neuropharmacology of Muscle Relaxant |
| | 183 | | 40,725 | Univ of Ill | Biochemical basis of Psychedelic Drug Actions |
| | 6562 | | 31,785 | U of Maryland | Incapacitating Agts of CW Chemicals |
| | 70 | | 481,583 | Hazelton Labs | Biological Eval of Lethal & Incapacitating Agts |
| | | Y 90% | 433,430 | | |
| | 255 | | 75,000 | Hazelton Labs | Proc & Eval of Naturally Occurring Biologically Active Mat |

FY 1963

## OUT-OF-HOUSE CONTRACTS (NON-AID)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 4008-02-024 (BIO) | 148 | | $ 33,341 | Harvard Col | Molecular Structure & Diffusional Processes Across Intact Epidermis |
| | 103 | | 260,768 | A D Little | Incapacitating Agt Rsch |
| | 215 | | 300,448 | Stanford Rsch | CML Incapacitating Agts |
| | 187 | | 11,000 | N Y School of Med | Endocrinological Effects of Altered Consciousness |
| | 253 | | 14,170 | Harvard Univ | Collection & Ident of Plant Mat'l |
| | | TOTAL PROJ | $1,774,460 | | |
| | | FACTORED | 1,722,551 | | |
| 4199-26-001 (BIO) | 149 | | 22,754 | Baylor Univ | Study of Effects on Certain Analgesic Drugs on Respiratory Center & Circulation of Humans |
| | 055 | | 10,000 | Johns Hopkins Univ | Sep 62 - Sep 63 - 'Effects of Amphetamine-like Cmpds |
| | 064 | | 13,000 | U of Maryland | Action of Ryania Extracts of Mammalian Skeletal Muscle |
| | | TOTAL PROJ | $45,754 | | |

FY 1964

## OUT-OF-HOUSE CONTRACTS (NON-AIT)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| 1060 (Cnt.) | AMC 103 | | $825,000 | A D Little | Incapacitating Agent Rsch (1963 - 1966) |
| | 111 | | 221,925 | Woodward Rsch | Screening of Selected Compounds (1963-1966) |
| | 108 | | 836,677 | FMC Corp | Search for New Incapacitating Agts (1963 - 1967) |
| | 128 | | 123,847 | FMC Corp | Synthesis of Compounds (1964 - 1969) |
| | | F 1/3 | 41,282 | | |
| | 130 | | 102,602 | Rsch Triangle Inst | Synthesis of Compounds (1964 - 1969) |
| | 137 | | 158,217 | Monsanto | Synthesis of Compounds (1964 - 1969) |
| | | F 1/2 | 79,109 | | |
| | 145 | | 174,300 | Hazelton Labs | Dev & Practical Application of New Primary Screening Metho |
| | 215 | | 177,000 | Stanford Rsch Inst | CML Incapacitating Agents |
| | 297 | | 306,100 | Rsch Triangle Inst | Search for New CML Agents |
| | 240 | | 50,000 | Chas Pfizer | CML Incapacitating Agents |
| | 6673 | | 400,000 | E I Dupont | Eval & Synthesis of CML Compounds |
| | 6574 | | 39,245 | Woodard Res Corp | Screening of Selected Compounds |
| | | F 1/3 | 13,081 | | |
| | | TOTAL PROJ | $3,514,913 | | |
| | | FACTORED | 3,327,076 | | |
| 4199-26-001 (CML) | 024 | TOTAL PROJ | 10,000 | Univ of Del | Synthesis & Chem of Heterocyclic Compounds |

FY 1964

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A079 (BIO)<br>5522.11.079 | 0252 | | $ 31,603 | Stanford Res Inst | Comparative Neuropharmacology of Muscle Relaxant |
| | 0148 | | 35,000 | Harvard Col | Molecular Structure & Diffusional Processes Across Intact Epidermis |
| | 0103 | | 200,000 | A D Little | Incapacitating Agent Research |
| | 0108 | | 220,000 | FMC Corp | Incapacitating Agent Research |
| | 0120 | F 80% | 269,200<br>215,360 | Hazelton Labs | Biological Eval of Lethal & Incapacitating Agents |
| | 0126 | | 101,923 | Univ of Penn | Threshold Doses in Humans |
| | 0175 | | 73,793 | Rsch Triangle Inst | Extraction of Bioassay of Natural Products |
| | 0183 | | 56,275 | Univ of Ill | Biochemical Basis of Psychidelic Drug Actions |
| | 0215 | | 191,900 | Stanford Rsch Inst | Chemical Incapacitating Agents |
| | 0240 | | 50,000 | Chas Pfizer & Co | Chemical Incapacitating Agents |
| | 0253 | | 18,792 | Friends of Psychiatric Hospital | Collection & Identification of Plant Material |
| | 0260 | | 66,300 | Inst For Behav Rsch | Drug Effect & Complex Behavioral Repertoires Under Conditio of Full Environmental Control |
| | 0277 | | 55,650 | Inst of Md Science | Subtle Toxic Effects Produced by Drugs |
| | 0282 | | 80,800 | Am Inst for Rsch | Effects of Drugs on Human Performance |
| | 050 | | 66,856 | St Louis Univ | Neurotropic Effect in Relation to Chemical Structure |
| | 6652 | | 50,000 | Contributors to Penna | Neurological Eval of New Agents |
| | 6673 | | 611,766 | E I Dupont | Eval & Synthesis of Chemical Compounds |

FY 1964

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT AIF. | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A079 (BIO)<br>5522.11.079 | 78 | F 90% | $ 162,263<br>146,030 | Hazelton Labs | Biological Eval of Lethal & Incapacitating Agents |
| | 0397 | | 44,000 | Baylor U, Col of Med | Study of Effects of Certain Analgesic Drugs on the Respiratory Center & Circulation in Humans |
| | | TOTAL PROJ<br>FACTORED | $2,394,201<br>2,324,128 | | |
| A097 (BIO)<br>5622.11.097 | 0255 | | $ 70,605 | Hazelton Labs | Procurement & Evaluation of Naturally Occurring Biologically Active Material |
| | 0253 | | 30,660 | Pres Fellows of Harvard | Collection and Identification of Plant Material |
| | 7113 | | 7,500 | U of Tennessee | Local Treatment of Vesicant Burns |
| | (6631) 7166 | | 48,310 | I I T Rsch Inst | Biomed Studies of BZ |
| | | TOTAL PROJ | $ 157,105 | | |

FY 1965

## OUT-OF-HOUSE CONTRACTS (NON-AIT)

| PROJECT/ TASK | CONTR NO | PERCENT APPL. | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A060 (CML)<br>5522.11.060 | 0042 | | 40,400 | Univ of Conn | Investg of Alkaloid Prod in Saprophytic Culture |
| | 0103 | | 530,000 | A D Little | Incapacitating Agent Rsch (1963 - 1966) |
| | 0111 | | 205,000 | Woodard Rsch | Screening of Selected Compounds (1963 - 1966) |
| | 0100 | | 530,000 | FMC Corp | Search for New Incapacitating Agents (1963 - 1967) |
| | 0128 | F 1/3 | 147,105<br>49,000 | FMC Corp | Synthesis of Compounds (1964 - 1969) |
| | 0130 | | 132,572 | Rsch Triangle Inst | Synthesis of Compounds (1964 - 1969) |
| | 0137 | F 1/2 | 106,771<br>93,400 | Monsanto Cal | Synthesis of Compounds (1964 - 1969) |
| | 0145 | | 160,400 | Hazelton Labs | Dev & Practical Application of New Primary Screening Method |
| | 0215 | | 175,256 | Stanford Rsch Inst | CML Incapacitating Agents |
| | 0297 | | 100,000 | Rsch Triangle | Search for New CML Agents |
| | 0336 | | 450,000 | E I Dupont | Eval & Synthesis of CML Compounds (1965 - 1968) |
| | 0345 | | 34,096 | Hazelton Labs | Irritant Screening of Compounds (1965 - 1969) |
| | 0344 | | 36,747 | Hazelton Labs | New Method Dev for Irritant Screening (1965 - 1966) |
| | 0240 | | 251,400 | Chas Pfizer | CML Incapacitating Agents |
| | | TOTAL PROJ | $2,907,747 | | |
| | | FACTORED | 2,796,271 | | |

FY 1965

## OUT-OF-HOUSE CONTRACTS (NON-ADP)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A079 (110)<br>5522.11.079<br>1C522301A079 | 0103 | | $ 150,000 | A D Little | Incapacitating Agent Rsch |
| | 0100 | | 200,000 | FMC Corp | Incapacitating Agent Rsch |
| | 0336 | | 62,626 | E I Dupont | Evaluation & Synthesis of CHL Agents |
| | 0240 | | 84,252 | Chas Pfizer | CHL Incapacitating Agents |
| | 0120 | F 80% | 513,397<br>410,700 | Hazelton Labs | Biological Evaluation of Lethal & Incapacitating Agents |
| | 0126 | | 65,000 | Univ of Penna | Threshold Dose in Humans |
| | 6652 | | 51,000 | Penn Hospital | Neurological Evaluation of New Agents |
| | 0026 | | 42,755 | Univ of Maryland | Drug Effects & Behavior Repertorives and Environ Control |
| | 0704 | | 16,000 | Johns Hopkins | Effect of Drugs on CHL Agents |
| | 0252 | | 43,833 | Stanford Rsch Inst | Comparative Neuropharmacology of Muscle Relaxant |
| | 0175 | | 11,000 | Resch Triangle | Extraction of Bioassay of Natural Products |
| | 0202 | | 9,848 | Am Inst for Rsch | Comparative Neuropharmacology of a Muscle Relaxant |
| | | TOTAL PROJ | $1,249,711 | | |
| | | FACTORED | 1,147,014 | | |

FY 1965

OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| B71A (B10)<br>5011.11.301 | 0368 | | $102,600 | Univ of Wisconsin | Behavioral Effects of Pharmacologic Materials |
| | 0253 | | 25,440 | Harvard Univ | Collection & Ident of Plant Mat'l |
| | 0007 | | 8,502 | Yale Univ | Relationship of Psychotomimetic Cmpds in Brain Neurohumors |
| | 0149 | | 12,000 | Baylor U Col of Med | Effects of Certain Analgesic Drugs on Respiratory Center |
| | 0135 | | 106,000 | Univ of Wisconsin | Method of Measuring CHL Induced Blood Changes in Mammalian Species |
| | | TOTAL PROJ | $254,542 | | |
| B71A (CHL.) | 024 | TOTAL PROJ | $ 12,073 | Univ of Del | Heterocyclic Nitrogen Compounds |

FY 1965

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A097 (B10)<br>5625.11.097<br>1C622401A097 | 7113 | | $ 2,321 | Univ of Tenn | Local Treatment of Vesicant Burns |
| | 0126 | | 64,917 | Univ of Penn | Threshold Doses in Humans |
| | 0175 | | 64,000 | Rsch Triangle Inst | Extraction of Bioassay of Natural Products |
| | 0791 | | 30,000 | Univ of Calif | Methods for Identification of Site and Mode of Action of Centrally Actg Incapacitating Compounds |
| | | TOTAL PROJ | $161,238 | | |

FY 1966

## OUT-OF-HOUSE CONTRACTS (NON-AIT)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A060 (CML)<br>5522.11.060 | 0042 | | $ 48,508 | Univ of Conn | Invest of Alkaloid Products in Saprophytic Culture |
| | 0103 | | 905,000 | A D Little | Incap Agent Rsch (1963 - 1966) |
| | 0111 | | 137,314 | Woodard Rsch | Screening of Selected Compounds (1963 - 1966) |
| | 0108 | | 727,000 | FMC Corp | Search for New Incap Agents (1963 - 1967) |
| | 0128 | F 1/3 | 41,000<br>13,600 | FMC Corp | Synthesis of Compounds (1964 - 1969) |
| | 0145 | | 185,000 | Hazelton Labs | Dev & Practical Application of New Primary Screening Methods (1964 - 1966) |
| | 0297 | | 163,006 | Rsch Triangle Inst | Search for New CML Agents (1964 - 1967) TOT $1,100,700 |
| | 0336 | | 1,348,933 | E I Dupont | Evaluation & Synthesis of CML Compounds (1965 - 1968) |
| | | TOTAL PROJ<br>FACTORED | $3,555,761<br>3,528,361 | | |
| B71A (BIO)<br>5011.11.301 | 6652 | | 53,802 | Penn Hospital | Neurological Evaluation of new agents |
| | 0281 | | 4,633 | Mt Sinai Hosp | Hypothalamic Control of Adrenocortical Function |
| | | TOTAL PROJ | $ 58,435 | | |

FY 1966

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A079-08 (B10)<br>5522.11.079 | 0120 | r 80% | $ 43,000<br>34,400 | Hazelton Labs | Biological Evaluation of Lethal & Incap Agents |
| | 0126 | | 65,000 | Univ of Penn | Research Work on Threshold Doses in Humans |
| | 0282 | | 53,409 | Am Inst for Rsch | Effect of Drugs on Human Performance |
| | 0722 | | 130,000 | Hazelton Labs | Biological Evaluation of Chemical Compounds (1966 - 1970) |
| | | TOTAL PROJ<br>FACTORED | $291,409<br>282,809 | | |
| A077-08 (B10)<br>5625.11.097 | 0722 | TOTAL PROJ | $ 33,000 | Hazelton Labs | Biological Evaluation of Chemical Compounds (1966 - 1970) |

243

FY 1967

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A060 (CHE.)<br>5522.11.060 | 0108 | | $130,091 | FMC Corp | Incapacitating Agent Rsch (1963 - 1966) |
| | 0128 | F 1/3 | 149,000<br>49,600 | FMC Corp | Synthesis of Compounds (1964 - 1969) |
| | 0145 | | 43,103 | Hazelton Labs | Dev & Practical Application of New Primary Screening Methods (1964 - 1967) |
| | 0336 | | 246,535 | E I Dupont | Evaluation & Synthesis of CML Compounds (1965 - 1968) |
| | 0484 | | 293,000 | FMC Corp | Incapacitating Agent Resch (1967 - 1968) |
| | | TOTAL PROJ<br>FACTORED | $861,729<br>762,329 | | |
| B71A (BIO)<br>5011.11.301 | 0296 | | 29,850 | Univ of Wisc | Methods for Measuring Chemically Induced Behavioral Changes in Various mammalian species |
| | 0189 | | 20,900 | Mt Sinai Hosp | Hypothalamic Control of Adrenocortical Function |
| | 0031 | | 19,082 | Cornell Univ | Effect of Toxic Agents on Energy Metabolism |
| | | TOTAL PROJ | $ 69,832 | | |
| 1079 (BIO)<br>5522.11.079 | 0722 | | 150,000 | Hazelton Labs | Biological Evaluation of Chemical Compounds |
| | 0126 | | 30,000 | Univ of Penna | Threshold Doses in Humans (1964 - 1967) |
| | | TOTAL PROJ | $180,000 | | |

FY 1968

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL. | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A060 (CML)<br>5522.11.060 | 0120 | F 1/3 | $145,000<br>48,300 | FMC Corp | Synthesis of Compounds (1964 - 1969) |
| | 0336 | | 1,507 | E I Dupont | Evaluation & Synthesis of CML Compounds |
| | 0023 | | 496,487 | Arthur D Little | Incapacitating Agent Research (1967 - 1972) |
| A060 (CML)<br>5522.11.060 | 0316 | F 1/2 | 125,000<br>62,500 | Hazelton Lab | Primary Toxicity Screening Test & Methodology (1967 - 1971) |
| | | TOTAL PROJ<br>FACTORED | $785,794<br>608,794 | | |
| B71A (BIO)<br>5011.11.301 | 0154 | F 10% | 17,800<br>1,700 | Univ of Penna | Experimental Basis for: (a) Treatment of CML Casualties<br>(b) Mode of Transport of gases thru lung membranes |
| | | TOTAL PROJ<br>FACTORED | $17,800<br>1,700 | | |
| A079 (BIO)<br>5522.11.079 | 0627 | | 33,418 | Ivy Rsch Lab | Threshold Doses in Humans |
| | 0722 | | 100,000 | Hazelton Lab | Biological Evaluation of CML Compounds (1966 - 1970) |
| | | | $133,418 | | |

FY 1969

OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| A060-08 (CHL)<br>5522.11.060 | 0023 | | $162,509 | A D Little | Incapacitating Agent Rsch (1967 - 1972) |
| | 0128 | | 95,200 | FMC Corp | Synthesis of Compounds |
| | | F 1/3 | 31,700 | | |
| | 0316 | | 87,074 | Hazelton Labs | Primary Toxicity Screening Tests and Methodology (1967-1971) |
| | | F 1/2 | 43,500 | | |
| | | TOTAL PROJ | $344,783 | | |
| | | FACTORED | 237,709 | | |
| A079-08 (B10)<br>5522.11.079 | 0627 | TOTAL PROJ | $ 44,717 | Ivy Rsch Labs | Threshold Doses in Humans |

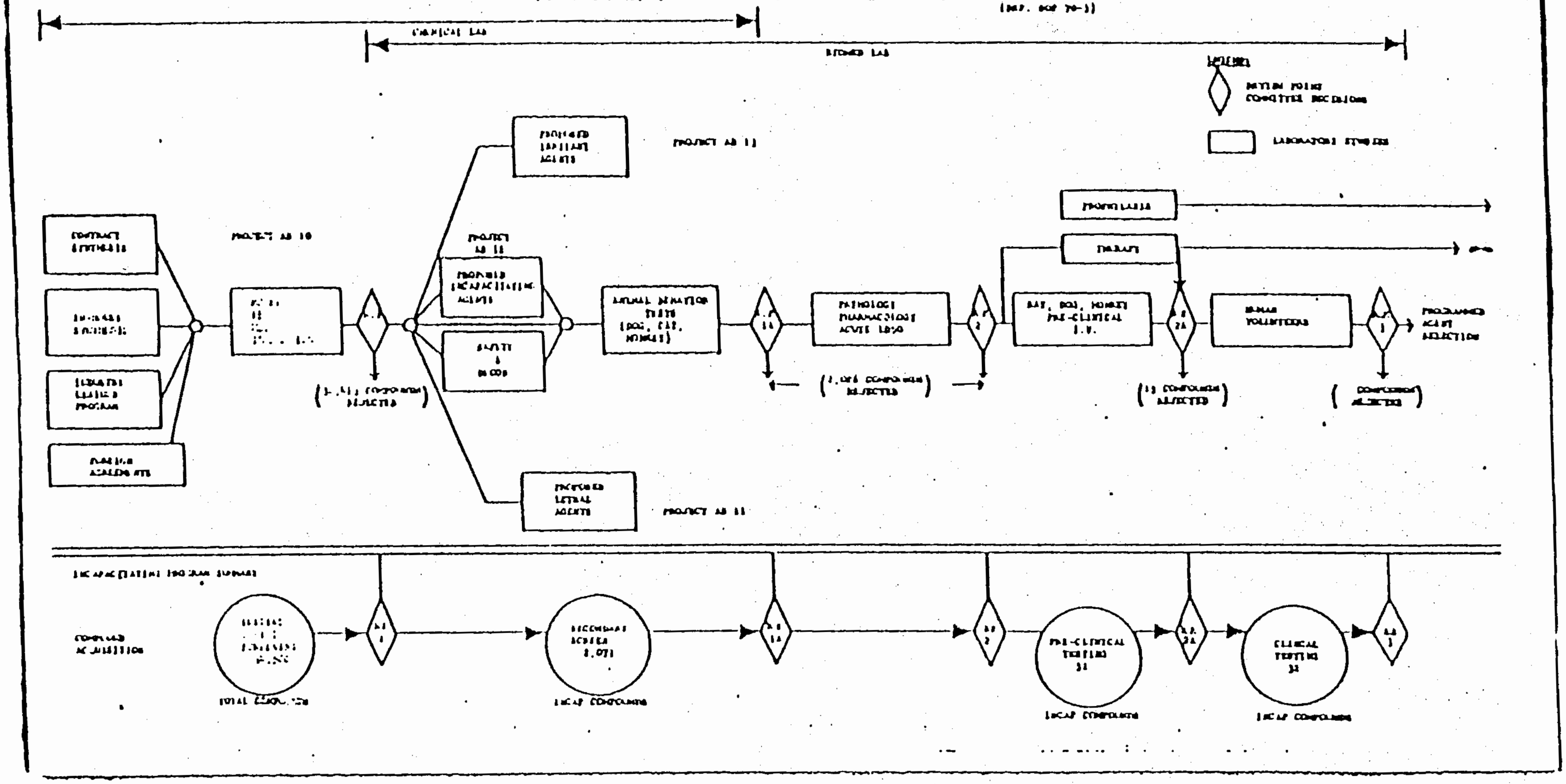
FY 1970

## OUT-OF-HOUSE CONTRACTS (NON-AIF)

| PROJECT/ TASK | CONTR NO | PERCENT APPL | AMOUNT | CONTRACTOR | CONTR TITLE OR SCOPE |
|---|---|---|---|---|---|
| AD12-02 (B10)<br>5528.11.791 | 7000324 | TOTAL PROJECT | (M-4 Rpt shows $19,672<br>Record of 1095's $48,000) | Ivy Rsch Lab | Threshold Doses in Humans (1970 -1971) |
| AD10-03<br>5528.11.789 | 0722 | TOTAL PROJECT | $85,000 | Hazelton Labs | Biological Evaluation of CW Compounds (1966 - 1970) |

# SECTION IV

# FLOW CHART FOR PROPOSED CHEMICAL AGENTS



## FLOW CHART FOR PROPOSED CHEMICAL AGENTS

]

## Flow Chart for Incapacitating Agent Search

All chemical compounds that merit consideration for development in the military agents program follow a prescribed procedure from inception to recommendation as candidate agent.

In the search phase, chemical compounds may be acquired from contract sources, originate through in-house laboratory investigations, or be solicited from industry, both domestic and foreign, as commercial samples. These compounds then enter the initial toxic screening program. The compound is evaluated for biological effectiveness in mice (as the test subject) by the intravenous route to determine whether it has lethal or incapacitating properties. The $LD_{50}$ (Lethal Dose to 50% of the animal population tested) are reported from these studies. Mouse inhalation studies determine whether the test compound is a respiratory irritant with potential riot control applications.

Review Point Committees which include among others, chemists, pharmacologists and physicians, follow the progress of the testing and at prescribed points recommend courses of action or rejection from further consideration of the test compound.

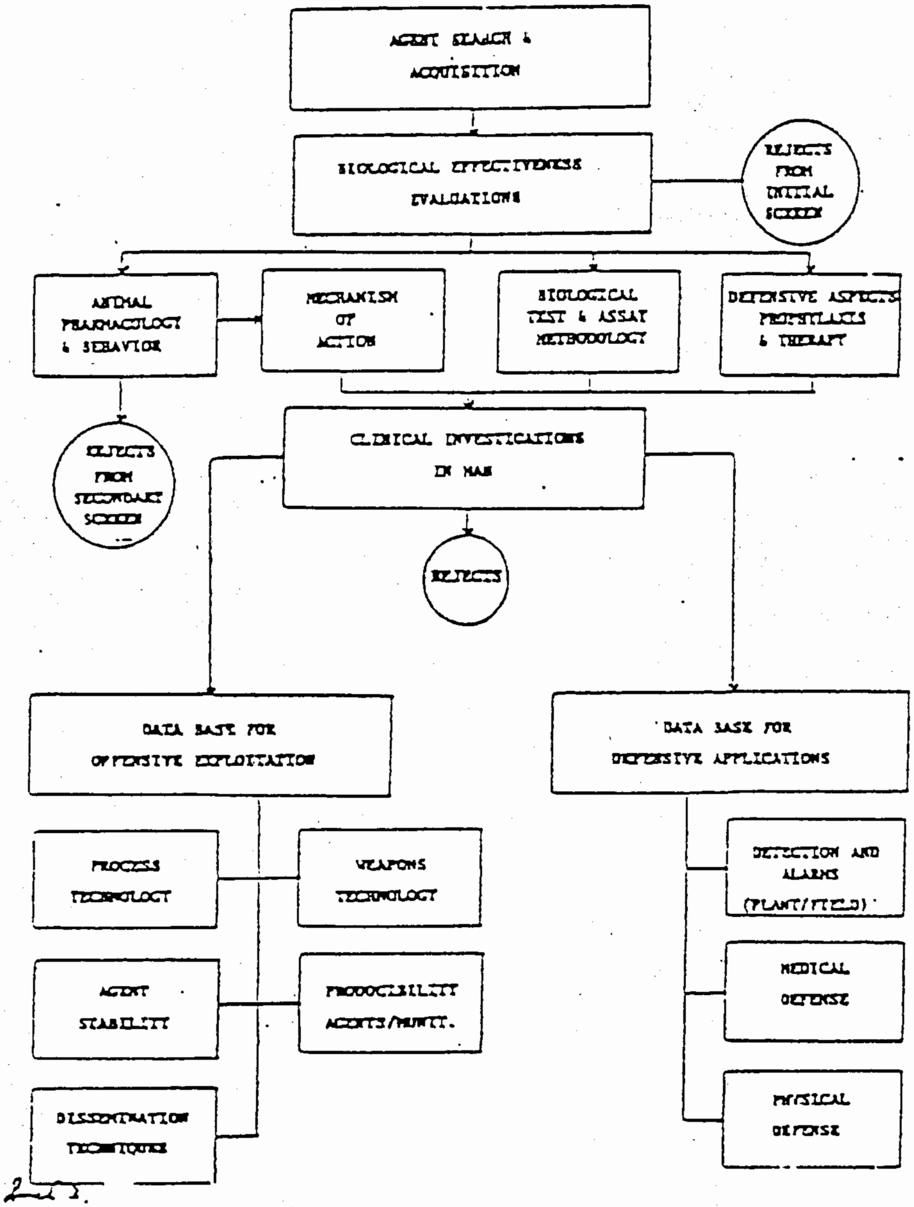
During secondary testing which includes animal behavioral studies, personal safety, including therapy, decontamination procedures, are established for the working personnel. Pathology and pharmacology of the compound in numerous species of test animals are studied and critically reviewed before advancing to pre-clinical animal tests and eventually the clinical evaluation in human volunteers.

Since the inception of the chemical agent program 34,500 compounds were subjected to testing in the initial mouse toxicity screen. Of these, 2,077 passed into the incapacitating agent program and underwent secondary animal behavior tests. Fifty-one (51) compounds were selected by Review Point I for further tests, and Review Point II then reviewed the data and recommended only thirty-two (32) compounds for preclinical and human assessment.

Thus, less than 0.1% of the compounds screened initially in the chemical agents search program were considered suitable for human volunteer assessment as incapacitants.

[illegible] 3(2)

## ELEMENTS OF SCIENTIFIC EVALUATION LEADING TO A MILITARY CHEMICAL AGENT


AGENT SEARCH & ACQUISITION
BIOLOGICAL EFFECTIVENESS EVALUATIONS
REJECTS FROM INITIAL SCREEN
ANIMAL PHARMACOLOGY & BEHAVIOR
MECHANISM OF ACTION
BIOLOGICAL TEST & ASSAY METHODOLOGY
DEFENSIVE ASPECTS PROPHYLAXIS & THERAPY
REJECTS FROM SECONDARY SCREEN
CLINICAL INVESTIGATIONS IN MAN
REJECTS
DATA BASE FOR OFFENSIVE EXPLOITATION
DATA BASE FOR DEFENSIVE APPLICATIONS
PROCESS TECHNOLOGY
WEAPONS TECHNOLOGY
AGENT STABILITY
PRODUCIBILITY AGENTS/MUNIT.
DISSEMINATION TECHNIQUES
DETECTION AND ALARMS (PLANT/FIELD)
MEDICAL DEFENSE
PHYSICAL DEFENSE

2 of 2.

# SECTION V

# INCAPACITATING AGENTS STUDY - 1961-1970

## EDGEWOOD ARSENAL

## INCAPACITATING AGENTS STUDY 1961 - 1970

1. Reference is made to letter, DAIG-IN, Ofc of the Inspector General and Auditor General, 9 Dec 75, subject: Request for Information Regarding Medical Volunteer Program.

2. Referenced letter requested an additional study be made to develop the follow-on costs in the development and manufacturing areas for incapacitating agents.

3. The previous study "Edgewood Arsenal Statement on Expenditures Relating to Incapacitating Agent Studies 1950 - 1975", covered the estimated cost of basic research and exploratory development of incapacitating agents which ultimately were used in experiments with Human Volunteers. This narrowing definition of the scope of the previous study logically precluded the inclusion of costs associated with dissemination and process technology beyond that necessary in the Human Volunteer Program. The limiting definitions utilized in firmly establishing the parameters of the previous study are included under cover of the previous study.

4. This study addresses those costs specifically excluded from the previous study by definition, and it focuses on fiscal years 1961 - 1970 (TAB B). Cost categories include dissemination, process, alarm, detection, development, and manufacturing methods technology. In addition to these captions, construction at Edgewood Arsenal is shown as another cost factor along with information provided by Pine Bluff Arsenal and Dugway Proving Ground as the last three major areas of interest of the Department of the Army Inspector General (DAIG). Data provided by Pine Bluff Arsenal is shown in TAB B broken down into cost factors of interest per FONECON between the Comptroller, Edgewood Arsenal and the DAIG's Office. Dugway Proving Ground effort was field testing funded through US Army Test and Evaluation Command, Aberdeen Proving Ground, Maryland. The type of funding listed for Dugway Proving Ground is Army and USAF at the advice of the Comptroller Office at Dugway Proving Ground due to the non-existence of documentary proof concerning the exact nature of the funding. It is believed to have been RDTE funding.

The dollar figures for the total program related to Incapacitating Agents from FY 1961 - FY 1970 are as follows:

| FISCAL YEARS | DOLLARS (In Thousands) |
|---|---|
| 1961 | $ 4,916 |
| 1962 | 9,115 |
| 1963 | 16,213 |
| 1964 | 16,502 |
| 1965 | 13,544 |
| 1966 | 9,149 |
| 1967 | 4,394 |
| 1968 | 4,257 |
| 1969 | 4,055 |
| 1970 | 4,370 |

These figures represent the additive total of dollar figures developed by this study and dollar totals by fiscal year extracted from the previous report to correspond to the fiscal years covered by this study. The dollar amounts extracted from the previous study (ref para 3) are as follows:

| FISCAL YEAR | DOLLARS (In Thousands) |
|---|---|
| 1961 | $ 3,571 |
| 1962 | 5,310 |
| 1963 | 8,799 |
| 1964 | 10,586 |
| 1965 | 10,294 |
| 1966 | 7,367 |
| 1967 | 4,075 |
| 1968 | 3,498 |
| 1969 | 3,447 |
| 1970 | 3,551 |

The figures shown on the schedule in TAB 8 are the difference between these two sets of figures and represent data solely related to this study.

5. As with the previous study, documentation to support each and every figure was not available, for many files and related documents have been retired/destroyed under the provisions of AR 340-18-3. Available personnel who worked in the Incapacitating Agent Program were utilized to temper estimates of program, for the fiscal years covered by this study, with their best judgement as to percentage relationships of incap program to total program/and incap effort to total effort. These judgements were used to influence the dollar figures shown in TAB 8 summarized below:

| FISCAL YEAR | DOLLARS (In Thousands) |
|---|---|
| 1961 | $ 1,345 |
| 1962 | 3,805 |
| 1963 | 7,414 |
| 1964 | 5,916 |
| 1965 | 3,250 |
| 1966 | 1,782 |
| 1967 | 819 |
| 1968 | 759 |
| 1969 | 608 |
| 1970 | 819 |

EDGEWOOD ARSENAL

INCAPACITATING AGENTS STUDY FY 1961 - 1970

(Thousands of Dollars)

|  |  | TYPE FUNDS | TOTAL | FISCAL YEAR 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GRAND TOTAL |  |  | 26,517 | 1,345 | 3,805 | 7,414 | 5,916 | 3,250 | 1,782 | 819 | 759 | 608 | 819 |
| 1. DISSEMINATION TECHNOLOGY |  | RDTE | 5,596 | 505 | 469 | 814 | 1,445 | 900 | 154 | 381 | 300 | 300 | 328 |
| (In House:) |  |  | (4,397) | (500) | (469) | (800) | (900) | (460) | (100) | (240) | (300) | (300) | (328) |
| Proj No. | Title |  |  |  |  |  |  |  |  |  |  |  |  |
| 029-02 | Dissemination Research |  | 1,269 | 500 | 469 | 300 |  |  |  |  |  |  |  |
| A081-01 | Dissemination Invest Liq/Solids |  | 1,960 |  |  | 500 | 900 | 460 | 100 |  |  |  |  |
| -04 | Thermal Dissemination |  | 1,118 |  |  |  |  |  |  | 240 | 300 | 300 | 278 |
| -05 | Mech Dissemination |  | 50 |  |  |  |  |  |  |  |  |  | 50 |
| (Contracts:)(1) |  |  | (1,199) | (5) | (0) | (14) | (545) | (440) | (54) | (141) | (0) | (0) | (0) |
| No. | Title |  |  |  |  |  |  |  |  |  |  |  |  |
| 029-02 | Dissemination Research |  | 19 | 5 |  | 14 |  |  |  |  |  |  |  |
| A081-01 | Dissemination Liquid/Solids |  | 1,180 |  |  |  | 545 | 440 | 54 | 141 |  |  |  |
| 2. PROCESS TECHNOLOGY |  | RDTE | 1,631 |  |  | 350 | 270 | 348 | 324 | 103 | 88 | 90 | 58 |
| (In House:) |  |  | (1,631) |  |  | (350) | (270) | (348) | (324) | (103) | (88) | (90) | (58) |
| Proj No. | Title |  |  |  |  |  |  |  |  |  |  |  |  |
| 1C522301A083-02 | Act EA 3443 |  | 693 |  |  | 250 | 195 | 248 |  |  |  |  |  |
| -05 | Act EA 1729 |  | 275 |  |  | 100 | 75 | 100 |  |  |  |  |  |
| -08 | Incap Agent |  | 324 |  |  |  |  |  | 324 |  |  |  |  |
| -08 | Incap & RC Agt |  | 281 |  |  |  |  |  |  | 103 | 88 | 90 |  |
| 1B562602AD12-03 | Process Tech of Incap Agts |  | 58 |  |  |  |  |  |  |  |  |  | 58 |
| (Contracts:) |  |  | None |  |  |  |  |  |  |  |  |  |  |

EDGEWOOD ARSENAL

INCAPACITATING AGENTS STUDY FY 1961 - 1970

(Thousands of Dollars)

| | | TYPE FUNDS | TOTAL | FISCAL YEAR 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3. | **ALARMS & DETECTION TECHNOLOGY** | RDTE | 275 | 50 | 50 | 100 | 50 | 25 | | | | | |
| | (In House:) | | (275) | (50) | (50) | (100) | (50) | (25) | | | | | |
| **Proj No.** | **Title** | | | | | | | | | | | | |
| A102-04 | Detection and Warning | | 275 | 50 | 50 | 100 | 50 | 25 | | | | | |
| | (Contracts:) | | None | | | | | | | | | | |
| 4. | **DEVELOPMENT & M.M.T.** | RDTE | 8,625 | 790 | 1,269 | 1,822 | 1,101 | 1,240 | 1,244 | 310 | 210 | 210 | 425 |
| | a. DEFENSE (2) | | 100 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 |
| | (In House:) | | (100) | (10) | (10) | (10) | (10) | (10) | (10) | (10) | (10) | (10) | (10) |
| | (Contracts:) | | None | | | | | | | | | | |
| | b. MUNITIONS | | 8,525 | 780 | 1,259 | 1,812 | 1,091 | 1,230 | 1,234 | 300 | 200 | 200 | 415 |
| | (In House:) | | (7,465) | (700) | (1,259) | (1,768) | (1,091) | (1,230) | (300) | (300) | (200) | (200) | (415) |
| **Proj No.** | **Title** | | | | | | | | | | | | |
| AD17 | Incap Cml Weapons Concepts | | | | | | | | | | | | |
| 01 | Incap Agent Wpns Investigations | | 62 | | | | | | | | | | 62 |
| 02 | Incap Agent Mortar/Artillery | | 117 | | | | | | | | | | 117 |
| 03 | Incap Agent Warhead/Air Munitions | | 236 | | | | | | | | | | 236 |
| A196 | Cml Weapons Sys Technology | | | | | | | | | | | | |
| 02 | Incap & RCA Wpns Sys Concepts | | 3,230 | | | | 1,000 | 1,230 | 300 | 300 | 200 | 200 | |
| LO16 | B2 Weapons Systems | | | | | | | | | | | | |
| 03 | Munitions Concepts: | | 726 | | | 635 | 91 | | | | | | |
| 029-10 | Munitions Feasibility Study | | 545 | 300 | 245 | | | | | | | | |
| 032-08 | New Aircraft CW Munitions | | 391 | 150 | 91 | 150 | | | | | | | |
| 032-16 | New Concepts for CW Munitions | | 995 | 250 | 245 | 500 | | | | | | | |
| 032-23 | Incap Agent/Munitions Sys | | 678 | | 678 | | | | | | | | |
| MIPR AF | B2 Munitions | | 483 | | | 483 | | | | | | | |

## EDGEWOOD ARSENAL

## INCAPACITATING AGENTS STUDY FY 1961 - 1970

(Thousands of Dollars)

| No. | Title | TYPE FUNDS | TOTAL | FISCAL YEAR 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | (Contracts:)(1) | | (1,062) | (80) | | (44) | | | (938) | | | | |
| 13-034 | Special Cml Wpn Sys | RDTE | 44 | | | 44 | | | | | | | |
| 029-10 | Munition Feasibility Study | RDTE | 80 | 80 | | | | | | | | | |
| A196-02 | Incap Agt Mortar/Artillery | RDTE | 938 | | | | | | 938 | | | | |
| 5. | EDGEWOOD ARSENAL CONSTRUCTION | | 238 | | 238 | | | | | | | | |
| | a. Building Modification | MCA | 112 | | 112 | | | | | | | | |
| | b. Building Modification | IHC | 126 | | 126 | | | | | | | | |
| 6. | PINE BLUFF ARSENAL | | 8,672 | | 1,779 | 4,328 | 2,474 | 44 | 12 | 7 | 12 | 8 | 8 |
| | a. Fac Constr & Restoration | MCA | 1,391 | | 1,391 | | | | | | | | |
| | b. Production Equip | PROC | 386 | | 386 | | | | | | | | |
| | c. Operational Cost Mfg | PROC-AIP | 6,842 | | 2 | 4,324 | 2,470 | 40 | 6 | | | | |
| | d. Storage | OMA | 40 | | | 4 | 4 | 4 | 4 | 4 | 4 | 8 | 8 |
| | e. Demil (Clean up) | PROC | 8 | | | | | | | | 8 | | |
| | f. Stockpiling | PROC | 5 | | | | | | 2 | 3 | | | |
| 7. | DUGWAY PROVING GROUND | | 1,480 | | | | 576 | 693 | 44 | 18 | 149 | | |
| | a. Field Testing | ARMY(3) | 1,108 | | | | 423 | 641 | 44 | | | | |
| | | USAF | 372 | | | | 153 | 52 | | 18 | 149 | | |

NOTES (1) See attached Contract listing.
(2) An estimate of $100M was used from FY 61-70 to obtain data on interface of incapacitating agents with masks and clothing and the decontamination of such agents.
(3) Type of Army funds unknown. Most likely RDTE.

EDGEWOOD ARSENAL

INCAPACITATING AGENTS STUDY 1961 - 1970

(Thousands of Dollars)

CONTRACTS

| | CONTRACTOR | NO | CONTRACT DATES | CONTRACT VALUE | INCAP PORTION | TITLE |
|---|---|---|---|---|---|---|
| 1. | Aircraft Armament Inc | Cml 6643 | 6/27/61-7/21/61 | 5 | (5) | Dev of Telecartridge Dissemination Techniques |
| 2. | Aircraft Armament Inc | AMC 80 (A) | 1/4/63-2/28/64 | 28 | (14) | Dev of Telecartridge Dissemination Techniques |
| 3. | Aircraft Armament Inc | AMC 102(A) | 7/28/63-8/1/65 | 97 | (44) | Technique as above for bomblets |
| 4. | Atlantic Research Corp | AMC 325(A) | 12/30/64-11/19/65 | 91 | (45) | Study of Polyurethane Binder Pyrotechnic Formulation |
| 5. | Dow Chemical Co | AMC 118(A) | 2/13/64-5/31/67 | 388 | (200) | Pyro Fuels & Thermal Dissemination of Chemical Agents |
| 6. | Aerojet General Corp | AMC 117(A) | 2/24/64-11/26/67 | 592 | (300) | Dev of Prototype Cml Munitions Systems |
| 7. | Atlantic Research Corp | C-0490 | 5/2/67-7/2/68 | 80 | (40) | Dev of Two Compartment System for Dissemination of Cml Agents |
| 8. | Stanford Research Institute | AMC 172(A) | 3/24/64-2/29/68 | 2,200 | (440) | Dissem Invest of Liquid & Solid Cml Agents |
| 9. | Northrop Carolina Corp | AMC 958(A) | 6/30/66-5/31/67 | 59 | (30) | Study of Pyrotechnic Fuel Mixtures |
| 10. | Dow Chemical Co | C-0498 | 9/8/67-9/11/70 | 203 | (101) | New Concepts in Thermal Dissemination |
| 11. | III Research Institute | AMC 739(A) | 4/19/66-4/30/68 | 49 | (24) | Dev of Two Compartment Dissemination Techniques |
| 12. | Aerojet General Corp | C-0198 | 3/12/66-9/30/68 | 938 | (938) | Fabrication of Air Drop BZ Clusters |
| 13. | Cornell Aeronautical Labs | CML 6628(A) | 6/22/61-6/6/68 | 2,251 | (80) | CW Agent/Munition Sys for Tactical Deployment |
| | | | TOTAL | 6,081 | (2,261) | |

## SOURCES FROM WHICH DATA WAS OBTAINED

1. Chemical R&D Program Structure FY 61-70.
2. Appendix A to Annex C of FY 61 Operating Program, 1 Dec 60.
3. 3rd R&A of Munitions Development Area FY 61, 3 Jan 61.
4. 5th R&A of Munitions Development Area FY 61, 30 Mar 61.
5. 7th R&A of Munitions Development Area FY 61, 29 Jun 61.
6. Appendix A to Annex C of FY 62 Operating Program, 1 Nov 61.
7. 2nd R&A of Munitions Development Area FY 62, 26 Sep 62.
8. CCTC Item 3960, 26 Feb 62 as amended by PEMA Br.
9. 1st R&A of Munitions Development Area FY 63, 9 Jul 62.
10. 2nd R&A of Munitions Development Area FY 63, 27 Mar 63.
11. USAF MIPR 08-635-62-9 BZ Munition.
12. Edgewood Arsenal Five Year Base Program (Applicable Year).
13. CRDL R&A 27 Oct 65.
14. WDEL R&A for Ground Munitions Laboratory, 6 Apr 66.
15. WDEL R&A 4th Qtr FY 67, 23 Jun 67.
16. WDEL R&A 1st and 2nd Qtrs FY 68.
17. WDEL R&A for FY 69.
18. WDEL R&A for FY 70.
19. Procurement Directorate Files.
20. Personal Experience Estimate.
21. Comptrollers Office, Pine Bluff Arsenal.
22. Comptrollers Office, Dugway Proving Ground.